The Chemical Age

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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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Looking Forward

PERHAPS the best advice that can be offered for the coming year to all engaged in industry is to look steadily forward. To look back is to be reminded of little but dislocation and loss. There is no inspiration or help to be got from the backward view; the philosophic as well as the practical policy is simply to cut it out and insist on creating a new mental starting point. If everyone could be induced to do this, and resolved to make the best of what is in front, it would probably be the safest step towards reconstruction that has yet been taken. After all, there remains a good deal in England to justify a feeling of thankfulness and hope. In spite of our enormous burdens, which have been borne with comparatively little grumbling, British credit, both moral and monetary, is steadily improving. The almost miraculous way in which our resources have always equalled our needs has impressed the world. British stocks stand as high as before the war. British products have an unexcelled reputation in every market. Business is undoubtedly better, and there is abundant capital waiting to be invested when a sufficient degree of stability has been regained to justify new enterprise. Our belief is that the firms which foster the highest enterprise will reap the best results. That has been so even in the worst periods. It will, we are assured, be more and more so in the easier conditions that are now slowly coming into view. The situation seems to us to call for a forward outlook and a forward policy, supported by honest work and a spirit of reliance upon ourselves. Let those confidently think of success and refuse to think of failure, who mean to achieve the one and avoid the other.

So far as THE CHEMICAL AGE is concerned, that will certainly be our attitude. Every year has witnessed an appreciable advance, and we look for even better progress in the coming year. As one modest step the proprietors have acquired *The China Clay Trade Review*, a monthly journal which has done much to help a distinctive British industry. This, for the future, will be published in the third issue of each month as a section of THE CHEMICAL AGE. What is known as the china clay industry includes many other natural products, such as stone, ball clay, felspar, and other materials, and has connections with the chemical, textile, paper-making, soap-making, and other industries. While it will, through this change, enormously extend these existing connections, those interested in chemical industry may find much of interest in its processes and applications, and both must inevitably gain. The first issue of the *Review*, to be published as a section of THE CHEMICAL AGE, will appear on January 20.

Alcohol from Trent Amalgams

SIXTY years ago Berthelot found that ethylene could be selectively absorbed from gaseous mixtures by concentrated sulphuric acid, and that the compound formed by the chemical union of the gas and acid was readily decomposed by heating with water, yielding ethyl alcohol. Only within the last few years has there been any attempt to make the use of this discovery technically, and the work which Mr. Ernest Bury has accomplished at Skinningrove is now well known. Mr. Bury successfully developed a process for converting the ethylene in coke-oven gas into alcohol, and with a gaseous mixture containing less than 3 per cent. of ethylene he obtained a yield of over 1½ gallons of alcohol per ton of coal. The process is one of considerable technical, as well as commercial, importance, and its potentialities have been appreciated in the United States, where it has recently been applied in connection with the coal and oil amalgams, which are produced by the Trent process. This latter process has already been accorded attention on more than one occasion in these columns, and those who have followed it up will be interested in the investigation which Mr. J. D. Davis, of the Pittsburgh experimental station, has lately conducted as to the expedience of recovering alcohol from the gases evolved. So far it has not been possible to recover from coke-oven gas

more than 50 per cent. of ethylene contained as alcohol; but it would undoubtedly be possible to improve this figure considerably by research. The problem offers possibilities, particularly in connection with the rich Trent gas. For example, De Loisy found that he could increase considerably the speed of absorption of ethylene by sulphuric acid through the use of catalytic agents, and thereby increase the recovery of alcohol.

Mr. Davis in carrying out his experiments modified the process of carbonisation as ordinarily conducted. In the usual practice coal charges are distilled at all temperatures from the decomposition point of coal to the highest retort temperature, thus no definite temperature can be fixed upon as that at which distillation is conducted. With the method used, the distillation range was made narrow. This was effected by feeding the charge regularly into a retort kept at constant temperature—that is, the predetermined distillation temperature. Distillations were conducted at temperatures of 400°, 500°, 600°, 700°, and 800° C., and the gases evolved were measured and analysed. Samples of the coal and oil used to prepare the amalgams were distilled under the same conditions as were the amalgams for purposes of comparison. In examining the results obtained it is to be noted that at a temperature of 500° C. the percentage of ethylene in the gas evolved from the amalgam was no less than 17, and at 400° C. the figure was 23·4 per cent. If the results, in fact, are compared with those obtained by Mr. Bury, it will be understood that, whereas with maximum recovery, it would be possible to obtain some three gallons of alcohol per ton of coal carbonized under ordinary coke-oven conditions, with the Trent amalgam gas the possible yield of alcohol is so much as 30 to 32 gallons per ton of amalgam distilled. It would seem, accordingly, that the Trent gas is ideal for the application of the alcohol recovery process, and the high percentage of unsaturated gases which it contains offers a promising field for research. Some interesting figures are given with regard to the effect on the calorific power of the gas of the ethylene stripping process. In general, the loss of heating power, due to stripping, approximates to 15 per cent.

"Tables Annuelles"

THE *Tables Annuelles de Constantes et Données Numériques* are numbered among the works of reference which are indispensable to any research laboratory or science library. They afford an annual summary of chemical, physical, and engineering constants, compiled by a number of distinguished abstractors from a great variety of scientific and technical periodicals and published under the auspices of an influential international committee; each volume, in fact, presents in an authoritative manner the results of a year's research of the laboratories throughout the world. Already Volumes I., II. and III. have appeared for the years 1910, 1911 and 1912 respectively. During the war the issues of the series had necessarily to be discontinued, but publication is now being resumed, and in the present Volume IV., issued for convenience in two parts, are collected numerical data from periodicals of the years 1913 to 1916 inclusive. Incidentally, it is gratifying to learn that the compilation of the subject-matter required to bring the Tables fully up to date is now nearing completion, and the publication of Volume IV. may soon be expected.

The volume under review follows fairly closely the lines laid down in the preceding volumes. A little more space, perhaps, has been devoted to the technological aspect of the subject, that is to say, to the constants relating to engineering and metallurgy; and this policy is to be welcomed, as adding to the utility of the tables in technical and commercial establishments. Also, the practice has been adopted, when practicable, of replacing long tables of figures by curves and diagrams, which are quite as useful and much more expressive. As before, French is the language employed in the text, though excellent indices, page headings, etc., are also printed in English, German, and Italian. The feature, too, is retained of including references to the publications from which the numerical data have been abstracted. In the compilation of this and the earlier volumes, the labour entailed must have been enormous and the expense very considerable; but there can be no gainsaying the value of the results. Research, nowadays, is being conducted on such an extensive scale and in so intensive a spirit, that it is of the utmost importance that the outcome should be rendered readily and generally available, particularly when the material would otherwise be accessible only with difficulty. It is to be hoped, therefore, that this valuable undertaking will meet with the support not only of purely scientific institutions, but also of an increasing number of commercial firms whose work is at all connected with the development of science, pure and applied. The publishers for the British Empire, it may be added, are the Cambridge University Press.

"Save the Surface"

THE decision of the National Association of Paint, Colour and Varnish Manufacturers of the United Kingdom to organise an advertising campaign to stimulate the use of paint is something of a novelty in this country, though the practice in the United States has long since become a commonplace. Of all the trade slogans adopted in America, it is agreed that none was ever more successful than "Save the surface and you save all." The habit of saving property of every kind by protective and decorative covering was established on a new basis, and being itself a good habit has not been discontinued,

What the effect of a similar campaign will be here remains to be seen, but the experiment is certainly worth making. It indicates a growing tendency on the part of whole trades to act in their collective interest. The difficulty in starting such efforts in the past has been the unwillingness of rival firms to recognise any common ground of action. They have kept, or imagine that they kept, their trade secrets strictly to themselves. Any disclosure of their methods was regarded as giving themselves away to the other fellow. Keeping their movements as much as possible to themselves, they unconsciously kept the trade in which all were engaged in the background too. That attitude is gradually being reversed. It is coming to be realised that if the claims of any industry or trade are effectively impressed on the public imagination, all the members gain in

proportion, but that can only be done when they work loyally together. The paint people have set a good example in undertaking a united attempt to push the whole industry a stage forward, and any move in the direction of collective activity is to be welcomed.

Protecting Professional Practice

IT is satisfactory to find the Institute of Chemistry standing up so well to the Ministry of Agriculture respecting the interference of State-aided agricultural colleges with private consulting and analytical practice. The Ministry's defence of the cheap analyses to which objection is taken is that they are limited to "educational" purposes only, but the cases taken up by the Institute hardly fall within this category, and it expresses its regret that the Ministry has not "intimated to those responsible for undertaking such work at an agricultural college in receipt of State aid that they are exercising functions beyond their legitimate sphere." "The carrying out," the Institute further states, "of analytical work by State-aided institutions at fees which are inadequate constitutes a grave injustice to the private practitioner, and, seeing that it is done through the medium of grants received for purely educational purposes, the Council feel strongly that it should not be allowed. They note that the Ministry is unable to accept the argument that because other producers cannot obtain free analysis, the farmer should not be so privileged; but the Ministry has given no reason for its attitude on that point."

The Institute's protest is the more weighty because it takes up the cause with clean hands, being itself careful to confine its own useful activities within its legitimate boundaries. State-aided institutions which cut into private professional practice are in the same class as societies established and endowed ostensibly for the promotion of science which expend their funds, not on science, but on competitive trading adventures. In the end the penny-wise policy brings more loss than gain. The world's work goes on better when each party sticks to its own job. In this matter, as in others, the Institute sets a good example in standing up for the professional position of which it is the recognised trustee and warning intruders off.

Detection of Arsenic

IN view of the number of cases before the public recently, of the presence of arsenic in foods, the Society of Public Analysts may be congratulated on having so promptly arranged for a conference on the subject to be held on Wednesday, January 17, at the University College, Nottingham, in conjunction with the local section of the Society of Chemical Industry. This is one of the instances in which the immediate bearing of chemistry on the public welfare is palpable, and may well be treated as an occasion for making the work of public analysts better known to the nation and for impressing on the directors of industry the importance of an efficient chemical service. In order to secure complete freedom of discussion, the conference will properly be treated as private, but in view of the public interest in the matter it is to be hoped that any decisions or recommendations arrived at will be made known without delay and given the widest possible publicity. The subject chosen is "The Detection and Determination of Small Quantities of Arsenic," and the discussion will be opened by Mr. A. Chaston Chapman, president of the Institute of Chemistry.

Annual Review Number

OUR thanks are due to many readersfor their letters of appreciation of our Annual Review Number, published on December 30th. The contributors who so loyally helped to make this issue the best review yet published of any year of chemical industry may be interested to know that their views have been widely reproduced throughout the British press and that they have done something to make the nation more sensible of its debt to chemical science and industry.

Points from our News Pages

The nitrogen industry in the U.S.A. is the subject of an article by Mr. Hartland Seymour (p. 6).

A review is given of exhibits at the Physical and Optical Societies' Exhibition (p. 8).

Our London Market Report states that the general trend is exceptionally firm (p. 17).

A quiet week with little business is recorded in our Scottish Market Report (p. 19).

Books Received

THE PHILOSOPHY OF MANAGEMENT. By Oliver Sheldon. London: Sir Isaac Pitman and Sons, Ltd. Pp. 296. 10s. 6d.

THE ADMINISTRATION AND FINANCE OF GAS UNDERTAKINGS. By George Evetts. London: Benn Brothers Ltd. Pp. 374. 32s. 6d.

The Calendar

Jan.		
8	Society of Chemical Industry. Joint Meeting with the Biochemical Society. Discussion on "Micro-Organisms and their Application to Industry and Research." 5 p.m.–7 p.m. 8.15 p.m.–10 p.m.	Institution of Mechanical Engineers, Storey's Gate, S.W.1.
8	Institution of Rubber Industry: "Plantation Rubber." P. J. Burgess.	Engineers' Club, Coventry Street, Piccadilly.
9	Mineralogical Society: Papers by A. Brammall, H. F. Harwood, and others. 5.30 p.m.	
9	Institution of Petroleum Technologists: "Further Investigations into the Physico-Chemical Significance of Flash-Point Temperatures." Dr. W. R. Ormandy. 5.30 p.m.	John Street, Adelphi, W.C.2.
9	The Institute of Metals (Birmingham Section). "X-Rays and Crystal Structure." H. B. Keene. 7 p.m.	Chamber of Commerce, New Street.
10	Royal Society of Arts. Juvenile Lecture II.: "The Spectrum, its Colours, Lines, and Invisible Parts, and Some of its Industrial Applications." Charles R. Darling. 3 p.m.	John Street, Adelphi, W.C.2.
11	The Institute of Metals (London Section): "Some Aspects of Electro-deposition." W. E. Hughes. 8 p.m.	Rooms of the Institute of Marine Engineers, 85-88, The Minories, E.1.
12	The West Cumberland Association of Chemists, Chemical and Metallurgical Engineers: "Steel Melting Furnaces and their Equipment." B. Mason.	Workington.

Recent Researches on Cellulose*

A Review by J. F. Briggs

It is with feelings of satisfaction that we greet this volume, the fourth of the series of collected "Researches on Cellulose," initiated in 1901 by Messrs. Cross and Bevan, but also with feelings of regret that, owing to circumstances, presumably the war, the authors have had to cover a period of eleven years under a scheme originally designed to be quinquennial. Eleven years ago the workers in the field of cellulose research were relatively few, and Cross and Bevan were responsible for the main bulk of this country's contribution to active investigation. On the Continent, while an important group of intensive workers, with B. Tollens and H. Ost as outstanding leaders, were in existence, their outlook was mainly objective, and even there, C. F. Cross was generally acknowledged as the greatest philosophical exponent of cellulose chemistry of the time. The record and directions of development from that position are to be found in the pages of this volume. In Great Britain many new centres of active research have been established and are producing results. American representatives have entered the field, and Continental centres have increased, expanded, and developed a philosophical outlook of their own.

On page 1, the authors have defined truly and concisely the scope and divisions of their subject, which resolves itself into two main lines. Cellulose substance, as an organic—or as we should prefer to say "organised"—colloidal complex, presents a different perspective of research from cellulose as an organic chemical, with structural formula, carbon and oxygen linkages and molecular dimensions. The method of treatment in this volume follows closely the scheme of earlier volumes; there is, and can be, no attempt to give in the space available a complete account of all the cellulose research work published during the period, but following simple rules of classification the publications of fundamental interest are either summarised in abstract or, in the case of less readily accessible literature, published largely *verbatim*, while the continuity of the argument is sustained and developed by running comments between the various items. This mode of treatment is particularly acceptable and stimulating. Thus the story of the virtual establishment of the structural constitution of the unit group of the cellulose molecule through the study of cellobiose, *l*-glucosan and methylcellulose, culminating in the brilliant thesis of the chemists of St. Andrew's University, is so clearly set out that it practically tells itself, and the somewhat disparaging statement on pp. 100-101 of the "agnostic position" taken up by the authors, fails to carry the weight intended. If we may be permitted a word of criticism on some of the authors' comments without detracting from our admiration for Mr. Cross's genius, we should say that in this and in certain other matters he is inclined to indulge too freely in the unprofitable occupation of "flogging dead horses." Progress is but seldom assisted by clinging too long to a negative hypothesis, and we suggest that the time has come for the authors to revise their attitude towards the cellulose-dextrose and the pentosan-furfuroid relationships.

The chemical constitution of the cellulose ultimate unit of $4(C_6)$ dimensions is for the time virtually settled, and Swiss and German investigators are turning their attention to the nature and degree of the polymerisation existing between these units to build up the cellulose fibre-substance. The arrangement of crystal symmetry postulated by Herzog and accepted by Karrer presents most fascinating possibilities, and the immediate future is bound to be closely concerned with the speculations developed along these lines. The clearing up of the cellulose-dextrose controversy liberates our British scientists to take their share in the attack on this far more intricate problem of the constitution of the fibre-substance as an organised colloid.

The major question is: What is the nature of the intermolecular forces which confer on cellulose its great structural and tensile stability? Cross and Dorée are right in predicting that the lines of attack will be largely physical, because the same properties, probably for the same reasons, are shared by other organic colloids, such as silk, wool and rubber, having no chemical relationship at all to cellulose. Nevertheless, they must also be chemical because a little touch of a mineral acid in the right place is capable of reducing the proudest cellulose to the dust. We must say in advance that the "blessed word"—Residual Affinities—without physical demonstration, electrical or otherwise, will carry us nowhere.

The phenomena of hydration operating through the hydroxyl groups are intimately bound up with the constitution of the colloidal state. It is becoming increasingly evident (p. 17, *et seq.*) that these phenomena, with all the chemical consequences involved, can be induced by purely mechanical means; an account of the Plauson colloid mill would have been in place in this connection. In Chapter IV the chemical evidences of hydration effects are dealt with in greater detail, but the data are still too scanty to form the basis of any broad connected theory. It will probably be found that hydration capacity is one of the fundamental properties of any hydroxylated colloid, of enormous importance in the chemical mechanism of the growth of the plant and in the manipulation of cellulose for industrial purposes, but external to the molecular structure and independent of the internal forces.

The contents of the chapter on oxycellulose and hydrocellulose form a valuable record of research, but at the present stage of knowledge they remain on an empirical basis. Except for their chemical similarity, both being manifestations of cellulose in its first stage of degradation, it is hardly fair, from a systematic point of view, to link oxycellulose and hydrocellulose so closely together. Hydrocellulose is "devitalised cellulose," and holds one of the keys to the major question: What is cellulose? whereas oxycellulose is only an accident.

The section on lignocellulose contains many abstracts, mainly of analytical importance, a summary of progress in this field; the method of arrangement whereby the chemistry of lignin is treated simultaneously with the discussion of the celluloses isolated from lignocellulose may be open to criticism. The lignocellulose question presents problems of absorbing interest in a little-explored field. It may be presented under two heads: What is the chemical constitution of lignin? What is the nature of the bond between the lignin and the cellulose? When these are answered, a further perspective will open itself concerning the physiological processes in the life of the plant and the chemical conditions which dominate the reactions in which cellulose may be regarded as the solvent medium.

* "Researches on Cellulose, IV. (1910-1921)." By C. F. Cross and C. Dorée. London: Longmans, Green and Co., 1922. Pp. 248. 15s.

Concerning the constitution of lignin, which belongs to the domain of pure organic chemistry, Cross and Bevan and P. Klason are the only investigators who have propounded working hypotheses. It is difficult to admit the [illegible] and their speculations are unsupported by any but meagre evidence of a general rather than a particular nature. Klason's speculations, on the other hand, are based on objective researches of much more modern date, and, although the flavone type of constitution (p. 172) may not represent the true or final picture, it is nevertheless worthy of more sympathetic discussion than that accorded to it by the authors.

A more recent elaboration of Klason's views has been developed in a paper by Von Euler (*Cellulosechemie*, 1921, 2, 128 and 1922, 3, 1), not coming within the scope of the present volume, on the constitution of the tannins of spruce needles. In this, the intimate analogy between lignin and the tannins has been drawn much closer, and the hydroxycinnamic aldehyde basis, promulgated by Klason, is given a most reasonable shape. The physiological modifications affecting these pseudo-tannins are defined as processes of hydrogenation and hydration in varying degrees, and the zone of reaction, possibly also the activating medium, is the colloid cellulose of the plant structure.

With regard to the nature of the association between the lignin and the cellulose, since Wislicenus propounded his adsorption theory, little or nothing has been done to investigate it from first principles. The hypothesis of Wislicenus found rather too ready acceptance as an easy formula for a difficult problem, and the time is certainly ripe for a careful sifting of all the evidence pointing to a chemical union. Little attention has been paid to a possible state of combination between lignin and the carbohydrates other than the normal cellulose, particularly between the lignin and the pentosans, which always occur and often move together.

The last chapter dealing with industrial applications and technology conveys a certain sense of disappointment. True, it is a vast subject hardly to be dealt with fairly in the forty-five pages allocated to it; nevertheless there is an absence of connected objective and in parts an indication of hurried compilation almost amounting to "padding." In a volume of this description no one expects or desires a detailed list of every petty invention in the vast field of cellulose industries, but systematic statements of the main lines of development in the principal branches and a broad analysis of the fundamental problems engaging the minds of technologists during the past decade might legitimately have been substituted. We look in vain for an illuminating survey of progress in the wood pulp industry, the artificial silk industry and the plastic cellulose ester industries and, while the textile industry does receive a fair share of space, the inner significance of the movement is not systematically expounded. The authors are to be congratulated on the inclusion of the otherwise inaccessible account of the important work of the Power Gas Corporation on the fermentation of cellulose, but their inference, on page 6, Chapter I, that cellulose fermentations take place in a manner essentially different from other fermentations is obsolete and unsupported.

It is unprofitable to enumerate omissions from this technological summary, but we cannot help mentioning three papers, all by H. Ost, which might have come within the scope of any work aiming to deal with fundamental principles. These are: The formation of the thread in artificial silk spinning (*Z. angew. Chem.*, 1918, 31, 141); The Chemistry of the Cellulose Acetates (*Z. angew. Chem.*, 1919, 32, 66 *et seq.*); The principles involved in the compression of cork waste (*Z. angew. Chem.*, 1918, 31, 105).

Anglo-American Unity

To the Editor of THE CHEMICAL AGE.

SIR,—At a time when so many influences in Great Britain and the Empire are favourable to the consolidation of Anglo-American unity, it may be of interest to your readers to know of the reciprocal influences which are beneficially at work in the United States. From the influential party of American trade journalists who visited this country in 1918 (arriving just in time to join in the Armistice celebrations), and who since their return have been working steadily to promote closer intercourse between the two nations, the following Christmas and New Year greeting has just been received:—

> A message of goodwill and holiday greetings to our British brothers, pledging anew our devotion to English-speaking unity and friendship as a beneficent and powerful influence for world-wide peace and prosperity.

This message, which is signed by a number of leading American publishers and journalists, comes as an encouragement to all who are interested in the future of the English-speaking race, and who believe that the unity of its aims and sympathies will be one of the greatest guarantees of world peace and prosperity.—Yours, etc.,

ERNEST J. P. BENN.

8, Bouverie Street, E.C.4,
December 29.

Chemical Societies' Work

To the Editor of THE CHEMICAL AGE.

SIR,—I have been greatly interested reading the notes on the work during 1922 of chemical and allied societies in your Annual Review number, and should esteem it a favour if you could inform me if it is possible for me to secure copies of the transactions of the Ceramic Society. As a Fellow of the Royal Society of Arts I take a deep interest in these matters. Thanking you in anticipation.—Yours, etc.,

COR PICKSTONE.

Nursery House, Chapelfield,
Radcliffe, Lancs.
January 3, 1923.

Greetings and Acknowledgments

THE Editor of THE CHEMICAL AGE desires to acknowledge with sincere thanks the many messages of goodwill received from readers and friends during the Christmas and New Year season. These include a welcome greeting from the party of American trade journalists who visited England in 1918; Dr. Ruttan, ex-president of the Society of Chemical Industry; Mr. H. C. Parmelee and the staff of *Chemical and Metallurgical Engineering*; Mr. H. E. Howe, editor of *The Journal of Industrial and Engineering Chemistry*, and many others. We reproduce below the humorous card received from Mr. Howe.

The Nitrogen Industry in the United States

Technical and Economic Considerations

By Hartland Seymour

THOUGH the war and subsequent developments in Germany made public at the meeting of the British Association at Hull served to impress the United States chemists with the necessity for American self-support as regards nitrogen supply, Major J. K. Clement, of the U.S. Army Ordnance Department, recently disclosed to the American Society of Mechanical Engineers that the desirability of independence in this matter was recognised before the entry of America into the world war, and that the United States Congress had appropriated in 1916 twenty million dollars for the investigation of nitrogen fixation and for the construction of nitrate plants. Consequently, in October, 1917, construction was begun on the United States Nitrate Plant No. 1 for the production of 10,000 tons of ammonia per annum, utilising a modification of the Haber process.

Subsequently the German submarine campaign threatened to reduce the shipping available for the transportation of nitrate from Chile, and so it was decided to erect a second nitrate plant late in 1917, to employ the cyanamide process, and to produce at the rate of 110,000 tons of ammonium nitrate per annum. A plant operating on these lines had been working for several years on the Canadian side of Niagara Falls and the services of these technicians were employed in the design and operation of the U.S. No. 2, or as it is better known, the Muscle Shoals Plant. Later it was decided to to erect Nos. 3 and 4 at Toledo and Cincinnati. These two plants, however, were not proceeded with. Plant No. 1 was run experimentally and was not a success, while the Muscle Shoals plant began to produce shortly before the armistice, but was run long enough to demonstrate its success.

United States Nitrate Plant No. 2 is situated in North Western Alabama, on the South side of the Tennessee River, about one mile below the Muscle Shoals. It is the largest cyanamide plant in the world, having a capacity of 220,000 tons of cyanamide or 110,000 tons of ammonium nitrate per year. Construction of the plant began in January, 1918, and operation in October, 1918. The total cost, including the 30,000 Kw. steam power plant on the Warrior River, the Warrior Muscle Shoals transmission line and the Waco limestone quarry, was approximately $70,000,000.

The principal raw materials required, according to Major Clement, other than the nitrogen of the air, are limestone and coke. The daily consumption of these materials when operating at full capacity is 1,200 tons of limestone and 300 tons of coke. An ample supply of limestone of pure quality is located about 30 miles south of Muscle Shoals. Coke can be procured at Birmingham, Alabama.

When operating at full capacity the plant requires approximately 85,000 Kw. This power will eventually be available at Wilson Dam, which is within a mile of the nitrate plant. To furnish the power during the war and prior to the completion of the hydro-electric development on the Tennessee River, two steam power plants were erected, one at Muscle Shoals, and one at Gorgas on the Warrior River. The plant at Gorgas, known as the Warrior extension power plant, was built as an extension to the existing plant of the Alabama Power Co. The generating unit is a 30,000 Kw. General Electric turbo-generator. The Muscle Shoals plant contains a 60,000 Kw. Westinghouse turbo-generator consisting of one high-pressure and two low-pressure turbines, each connected to a 20,000 Kw. generator.

Carbide Production

The limestone is burned in seven rotary kilns—one of which is a spare unit—each having a capacity of 200 tons of stone a day. The coke is crushed and dried, and the lime and coke are mixed in suitable proportions for charging into the carbide furnaces. The carbide furnaces are twelve in number, ten being required for full capacity operation. Each furnace has a rated capacity of 50 tons of 80 per cent. calcium carbide per day. The power consumption of one furnace is 6,000 Kw. The current is 3-phase, 60 cycles, and enters the furnace from the top, through carbon electrodes. At the temperature of the electric arc the lime and coke react to form carbide in accordance with the equation :

$$3C+CaO=CaC_2+CO$$

The process is continuous, the molten carbide being tapped from the surface at intervals of about 40 minutes. The carbon monoxide gas burns on contact with the air to carbon dioxide which escapes into the atmosphere.

The carbide is allowed to cool and is then ground to a fine powder. From the mill it is conveyed to the lime-nitrogen or cyanamide building, where the fixation of nitrogen takes place. At a temperature of about 100° C. calcium carbide and nitrogen react in accordance with the equation :

$$CaC_2+N_2=CaCN_2+C$$

For this reaction a pure quality of nitrogen is desired. The nitrogen is separated from the oxygen of the air by the Claude process. The nitrogen or liquid-air building contains 30 Claude columns, each having a capacity of 500 cu. m. of nitrogen an hour. The electric ovens in which the fixation of nitrogen takes place consist of vertical cylinders about 30 in. inside diameter and 5 ft. high. The heating unit is a carbon pencil located in the centre of the oven. There are 1,536 of these ovens. The weight of a charge of carbide is about 1,600 lb. Nitrogen gas enters at the bottom of the oven. After about four hours the electric current is turned off and the reaction, being exothermic, proceeds without further external heating. The process requires about 40 hours for completion. The product is removed from the furnace in the form of a cylindrical pig of cyanamide or lime nitrogen. After cooling, the pigs are crushed and ground to a fine powder. In this condition the lime nitrogen contains about 1 per cent. of calcium carbide, which is removed by spraying with water, the water reacting with the carbide to form acetylene gas which escapes. Calcium cyanamide reacts with steam under high pressure to form ammonia. The reaction is as follows :

$$CaCN_2+3H_2O=2NH_3+CaCO_3$$

This reaction takes place in large heavily walled steel autoclaves. The process is intermittent and requires from six to eight hours. The ammonia gas passes out at the top of the autoclave and carries with it a large amount of steam. Most of the steam is removed from the gas by condensation. The calcium carbonate is discharged in the form of a sludge and is a waste product. The plant has a capacity of 150 tons of ammonia per day.

Oxidation of Ammonia

The production of nitric acid from ammonia had never been carried out on a commercial scale prior to the world war, although the Ostwald process for the oxidation of ammonia to nitric oxide had been tried out on a small scale. If a mixture of ammonia and air is heated to a temperature of, say, 1,000° C. under ordinary conditions, the reaction products obtained are nitrogen and water vapour. Ostwald found that by passing the gas over a suitable catalyser, such as a fine platinum gauze, heated to a bright red heat, most of the nitrogen in the ammonia may be oxidised to nitric oxide :

$$2NH_3+2\tfrac{1}{2}O_2=2NO+3H_2O$$

On cooling, the nitric oxide combines with more oxygen to form nitrogen dioxide, which is then absorbed in water to form nitric acid.

In the Muscle Shoals plant the oxidation takes place in aluminium boxes or converters in the bottom of which the electrically heated platinum gauze is held in a horizontal position. The mixture of ammonia and air is passed downward over the gauze and the products of the reaction are carried to coolers and then to the nitric acid absorption towers. The capacity of the plant is about 450 tons of 50 per cent. acid per day.

Ammonia and nitric acid react readily to form ammonium nitrate in accordance with the equation :

$$NH_3+HNO_3=NH_4NO_3$$

This reaction takes place in tanks lined with acid-proof brick, the ammonia gas being piped into the tanks from above. The product is a liquor containing about 45 per cent, ammonium nitrate. This liquor after being freed from sediment is piped to the nitrate houses where the water is evaporated and the ammonium nitrate is finally obtained in granular form. It is then ready to be loaded in cars and shipped to powder plants. During the time the plant was in operation about 1,700 tons of high-grade ammonium nitrate was produced.

During the war ammonium nitrate was used chiefly in the manufacture of amatol, a mixture of ammonium nitrate and trinitrotoluene in the proportion of 80 parts ammonium nitrate to 20 parts of TNT. Of the several products which the plant is capable of producing without any additional facilities, two are available for use as fertiliser material; cyanamide and ammonium nitrate. Although certain of its chemical properties have limited the amount that may be safely used in a ton of mixed fertiliser, large quantities of cyanamide have been used in fertiliser material. It can be produced at a lower cost than any other form of fixed nitrogen. Ammonium nitrate has not been used heretofore in commercial fertilisers to any appreciable extent. While it is entirely suitable as a plant food, its marked hygroscopic property is an obstacle to its use in fertilisers. If a way is found to overcome this property it will undoubtedly be in demand as a fertiliser material. The one product for which a market is at hand, and which could be produced at Nitrate Plant No. 2 is ammonium sulphate. To manufacture this material it would be necessary to provide additional facilities at a cost of, perhaps, two million dollars. In case the plant is operated for the production of fertiliser material, ammonium sulphate will probably be the principal product until such time as a market is developed for other products.

America and the Next War

One of the chief advocates of United States independence in the matter of nitrogen supply is Professor Alfred H. White of the University of Michigan, and amongst America's leading chemists. Professor White's opinion is that commercial explosives will always be manufactured in the U.S., and it may, therefore, be argued that there will always be an adequate nucleus of a personnel for war needs. But is it probable, says he, that the manufacturers in the U.S. will be the leaders in the development of new materials which might be used in warfare? What kinds of explosive will be used in the next war? The only answer which it is possible to give at the present time is that they will be unstable chemical compounds which will have to be synthesised with very great care, and will almost certainly be complex organic compounds. The one type of factory which is always working with this form of synthetic organic compounds is that which manufactures dyes.

The connection between the dye industry of any country and the manufacture of poison gases has been frequently discussed. The relation between the dye industry and explosives has not been emphasised so much, maintained Professor White, and yet the operations of nitration are fundamental both to the dye industry and the manufacture of explosives, and certain materials, such as picric acid and dinitrophenol are in themselves explosives as well as products of the dye manufacturer. The relation of explosives to poison gas is so very close that it is not possible to say with certainty where one begins and the other leaves off, and it is possible to give one specific instance of the ready adaptation of a dye works to the manufacture of poison gas.

The Badische Anilin-und Soda-Fabrik of Germany has a capacity to produce 800,000 lb. of indigo each month. Its process starts with alcohol, which is converted into ethylene and then with ethylene chlorhydrin. This latter product is heated with aniline and the oily residue is fused with caustic potash; indigo is at once obtained from this fusion by solution in water and oxidation by air. Were Germany to be drawn into war, this plant might be converted into a mustard-gas plant in scarcely an hour's time. The first two steps in the process are identical; in the third step, sodium sulphide, a cheap chemical, is substituted for aniline, and the solution thus obtained is concentrated and treated in large tanks with hydrochloric acid. The oily product settling out at the bottom is the well-known mustard gas, and may be drawn off at will. This instance of the adaptation of a dye works to war purposes is cited partly to show the impossibility of chemical disarmament. Any nation which permits its dye industry to perish is in danger of destruction by an enemy which is prepared to unmask these terrible agencies of destruction. These industries play an important part in our modern industrial organisation, and unless the world is willing to do without colours and also synthetic medicinal products, these plants cannot be wiped out. The only safe protection, says Professor White, appears to be in an equality of preparedness.

The Importance of Fertilisers

Quite apart from war needs is the importance of nitrogen to peace requirements. One of the most eminent American agriculturists, the late Dr. C. G. Hopkins of the University of Illinois, showed that one of their experimental fields which had been carried on crop rotation for seven years without fertilisation decreased in fertility so that the crop of corn fell from 57.3 bu. to 33.9 bu., and oats decreased from 74.4 to 25.9 bu. per acre. A check plot fertilised by addition of nitrogen and phosphorus increased its yields of corn over that given in the earlier years, and gave a crop of oats which, while not so large as in the first year of the test, was still 20 bu. greater than that given by the unfertilised plot.

The same authority cited the case of Russia, where the average annual yield of wheat for 20 years is 8¼ bu. to the acre and where a decrease of only 2 bu. to the acre means a famine. He gave the following solemn warning, which is strikingly similar in import to that of President Roosevelt cited here:—

"With the exception of a few small countries, the record of our race is a record of ruined lands: and if we repeat in the great corn belt of America the history of the white race in Palestine, in southern Europe, in Russia and in the eastern part of the United States, where shall our children go for bread?"

In the United States they have been accustomed to think of the soil as a permanent asset, just as a generation ago they considered petroleum, natural gas and coal as permanent assets which did not need to be conserved. Yet the evidence is clear that even the richest soils are deteriorating. The State of Illinois is, on the whole, one of the richest farming states in the United States, and yet Dr. Hopkins has stated that if continuous crops of corn of 100 bu. per acre were grown on the Illinois farm lands, the supply of phosphate in the soil reached by the ploughing would not be diminished, but totally exhausted in from 51 to 105 years. A corn crop of 100 bu. requires for the grain alone 100 lb. of nitrogen. Some of the poorer farm lands of Illinois contain only sufficient nitrogen in the surface soil for 46 crops of this sort, and none except the deep peat soils contain enough nitrogen in the surface soils to last more than 67 years. It is recognised that phosphates and other mineral fertilisers must be maintained. The nitrogen problem is, however, of more importance. The Illinois Agricultural Experiment Station states: "The nitrogen problem is the most important practical problem confronting the American farmer."

Although there is agreement among agriculturists and scientists as to the seriousness of the nitrogen problem in agriculture there is not the same unanimity as to the best means of maintaining the nitrogen content of the soil. The early Roman writers on agriculture knew the value of leguminous crops as restoratives of soil fertility. The system of maintenance of a permanent system of soil fertility by proper residues forms the basis of the system advocated by Dr. Hopkins for Illinois soils. However, the system requires more than the usual care, for their bulletin states that the nitrogen of the soil cannot be maintained simply by incorporating a legume in the rotation, as is too often assumed. The proper utilisation of the legume hay produced, and the return of its nitrogen to the soil is a problem of utmost practical importance. The use of a legume cover crop in wheat and oats also plays an important part in maintaining the nitrogen supply of the soil. The legume so used is probably of more importance really than its occurrence in the regular rotation.

It has been proved that the nitrogen content of soil such as that of Illinois can be maintained without addition of a commercial fertiliser, provided sufficient attention be paid to the biological processes. The question is not, however, decided for other types of soils and other methods of farming, and it is not settled whether the maintenance of the nitrogen content

of soil through legumes is as economical as its partial restoration through commercial fertilisers. This is a question which can be answered only by a careful economic study and one which from its nature will have to be reconsidered with every variation in the cost items which enter the computation. The recent increase in the value of farm lands and in farm labour has made it necessary to recast pre-war figures. The combined crops of wheat, oats, and corn in the United States amount roughly to 5,000,000,000 bu. annually. Each bushel removes from the soil about 0.9 lb. of nitrogen, so that the total annual loss of nitrogen from the soil in the grains alone is 4,500,000,000 lb., or 2,250,000 tons, of nitrogen. This is not an exorbitantly high estimate. Dr. Lipman, director of the New Jersey Agricultural Experiment Station, was quoted in the hearings before the Senate Committee on Agriculture and Forestry as having estimated that the total annual loss of nitrogen from all land under cultivation in the United States, after making allowance for all returns to the soil, was between three and four million tons.

These figures are staggering, but the authority is good. Suppose, then, 2,250,000 tons have to be returned to the soil. The tankage, cottonseed meal, and other organic compounds now used account for only 4 per cent. of this amount and their total is decreasing rapidly. The coke ovens and private plants for nitrogen fixation in the United States would make up less than 5 per cent. Imports of Chilean nitrate in the same amount as used for fertiliser before the war would furnish only 2 per cent. There is lack of agreement as to the future life of these Chilean nitrate deposits. The organic wastes, coke-oven ammonia and Chilean nitrates might together account for perhaps 11 per cent. of the 2,250,000 tons of nitrogen called for annually to replace that removed from the soil by the grain crops. The remaining 2,000,000 tons would have to come from fixation processes. The foremost American chemists agree that the supply of fertilisers for peace and explosives for war is centred largely on the question of the supply of fixed nitrogen. Taking the war aspect first, it seems apparent that with the increased production of American coke ovens, the private plants for nitrogen fixation, with the government plants for reserve, are sufficient to provide for American defence.

On the question of agricultural fertilisers the Americans take far more serious views. In the past farmers moved from one state to the next as the soil became unproductive, but there is naturally a limit to this migration. Further, the system of crop rotation is not successful in replacing nitrogen, as it involves an absolute lack of return from the soil during the fourth year. The question remains, then, whether the fixation of nitrogen can be accomplished so economically that it can produce the nitrogen required to maintain the fertility of the United States soil. This is the problem on which American industrial chemists are now concentrating.

Research on Fundamental Properties of Cast Iron

ARRANGEMENTS have been made by the British Cast Iron Research Association for the early prosecution of definite and systematic research on some of the fundamental properties of cast iron. The range of irons to be examined in the first place will include the full run of commercial grey irons and semi-steels. Special reference will be given to liquid shrinkage and solid contraction, and this side of the work will be further supplemented by a correlation of chemical, mechanical, physical, thermal, structural, and magnetic properties. In reference to thermal properties it is intended specially to investigate volume changes due to temperature, the critical ranges, and the effect of initial temperature on these ranges, and to follow up with a systematic investigation of the physical properties of commercial grey cast irons at temperatures higher and lower than atmospheric. This, when completed, will give results of real and direct value in the case of all types of castings which in working life are subjected to abnormal temperatures. These studies will also include the effect of repeated reheating. The practical foundry value will lie in the direction of developing types of cast iron adaptable for abnormal temperature working conditions. The resistance offered to various corrosive agents will also be studied.

Scientific Instruments

Interesting Exhibition at South Kensington

THE thirteenth annual exhibition of scientific apparatus organised by the Physical Society of London and the Optical Society was held on Wednesday and Thursday at the Imperial College of Science, South Kensington.

Bellingham and Stanley, Ltd., were showing polarimeters, refractometers and a new British saccharimeter which possesses some interesting qualities. In addition to their standard refractometer, which is designed for the examination of materials of widely differing nature, the firm have a special instrument for materials whose refractive indices lie between 1·42 and 1·49. An ultra-violet polarimeter arranged in conjunction with a Bellingham-Stanley spectrograph for the examination of optically active substances in the ultra-violet was also shown.

A very comprehensive collection of their manufactures was displayed by the Cambridge and Paul Instrument Co., Ltd., and this included an automatic balance for recording the weight of sedimentation in a liquid, and two types of hydrogen ion apparatus.

Some of the industrial applications of "Formite," a phenol-formaldehyde condensation product, were shown at the stand of the Damard Lacquer Co., Ltd. In the initial state "Formite A" is soluble in alcohol acetone, fusel oil, and other aliphatic solvents, and is insoluble in benzene, solvent naphtha, etc. In the state known as "Formite B" it is, the makers state, infusible and unaffected by moisture, most chemicals, and all solvents; moreover it possesses good insulating properties for both heat and electricity. "Formite" varnishes, which are made in several grades, are used for the protection of chemical plant from the attack of acids, etc.

The "Meg" insulation tester, recently described in these columns, formed a prominent feature in the exhibit of Evershed and Vignoles, Ltd., and among other instruments shown were the "Dionic" water tester, for indicating the amount of inorganic impurity dissolved in water, and a range of new pattern chart-recording instruments based on the Murday system of rectangular co-ordinate charts and adaptable to a wide range of recording problems.

Thermo-couple pyrometers, both base metal and rare metal, indicating for fixed or portable use and also recording, were shown in operation at the stand of the Foster Instrument Co. Other exhibits of interest included the "Foster" commutator recorder for recording two industrially related temperatures on one chart, and the "Foster" alarm recorder, which operates an alarm when a given temperature limit has been passed.

An electric thermostat, embodying a novel stirrer actuated by means of an electro-magnetic plunger, was exhibited for the first time by A. Gallenkamp and Co., Ltd. This instrument was designed for use in the Science Museum and will shortly be placed upon the market. In addition to their electric furnaces the firm exhibited an electro-titration apparatus designed for hydrogen ion concentration to the first decimal place, and for the preparation of accurately neutral or buffer solutions. It can also be used for all acid-alkali titrations and for oxidation titrations of iron, zinc, etc.

Mr. F. Harrison Glew exhibited radio-active substances and apparatus, radium clocks, ionised cloud apparatus, radium spirals, scintilloscopes, etc.; while Adam Hilger, Ltd., who gave demonstrations of applications of the interference of light, showed "flame" spectrometers, diffraction gratings, a new interferometer for physical laboratories, etc. A new type of steam flow indicator was shown by George Kent, Ltd., and a titration lamp specially designed for use in laboratories for titration work at night, by Mr. F. E. Lamplough. The exhibit of Liquid Air, Ltd., included a selection of thermo-electric pyrometers, liquid air, and containers. A new automatic recording calance for ascertaining variations in the weight of liquids or gasses through evaporation was a prominent exhibit at the stand of L. Oertling, Ltd., who were also showing a selection of chemical balances, hydrometers, saccharometers and petroleometers.

Exhibits showing some of the activities of the Physics Department of the National Physical Laboratory included the testing of thermometers, the determination of the thermal conductivity of various materials used in cold storage, and the examination of the fluorescent properties of various substances under ultra-violet light.

Fastness of Dyes to Light

Testing by the Fade-Ometer

In the past it has been practically impossible for different persons to agree upon the fastness to light of dyes, inks, paints, etc., because of the unreliability and slowness of sun tests and on account of the lack of a satisfactory form of artificial test. Exposure to sunlight, the most natural method, gives results which are unsatisfactory because the chemical action of sunlight varies considerably owing to difference in solar radiations and changing atmospheric conditions, apart from the difference in locality and seasons of the year.

Standardisation of sunlight is impossible and no single test can ever be accurately reproduced. The artificial test of the past has been by the mercury arc lamp. This gives a light exceedingly rich in ultra-violet rays but deficient in many rays which would make its light comparable to sunlight in their effect on dyes, many of which are affected in a manner very different from the changes produced by actual sunlight. Results are particularly erratic when pigments containing barium, cadmium, copper, ferric and ferrous salts, iodine, lead salts or zinc silicate are tested. The great point in its favour is its rapidity of action when the quartz tube is new, but since this tube gradually devitrifies in use (that is, the quartz turns to glass), it becomes steadily less efficient, since the ultra-violet rays from a low temperature source pass easily through quartz but are stopped by glass.

It is claimed that these difficulties are overcome by the use of an apparatus called the Fade-Ometer, manufactured by the Atlas Electric Devices Co., Inc., of Chicago, and handled by A. D. Lang, Ltd., of 4, Vigo Street, London, W.1, as sole European agents. This apparatus uses a violet carbon arc, the spectrum of which at the violet end closely reproduces the solar spectrum, and which gives an intensity of light great enough to enable tests to be made in a short space of time. In addition to this, the light is of uniform quantity and intensity at all times during the life of the apparatus and results obtained are always comparable. In the case of dyed textiles, an exposure of one hour in the Fade-Ometer has the same fading effect as 1·3 hours' exposure to June sunlight. In the case of ink, one hour's exposure is equivalent to ·7 day's June sunlight.

With respect to the construction and operation of the apparatus, the violet carbon arc is regulated automatically between special electrodes. A cylinder surrounds the arc and encloses all the controlling mechanism. It has a series of forty exposure openings equally spaced from the arc, and each exposure opening receives identically the same volume of light per unit of area, thus providing for forty identical tests at one time. The samples are placed in holders which are positioned before the cabinet openings. The holders are arranged to take samples up to 2½ by 4½ in., and to cover a portion of the sample so that comparison may be made between tested and untested portions. The cylinder is made in two sections, the lower of which can be raised for renewing the electrodes and cleaning the globe. The construction is such that the temperature of the exposed samples is normal during the test. Underneath the light is provided a humidifier which is kept filled with water. The radiant heat from the light evaporates this water and carries the vapour upward through the cylinder, thus maintaining the proper humidity in the region of the samples. The arc lamp may be arranged to run on any circuit, either direct or alternating current. The apparatus when set up ready for use occupies a floor space of 28 in. square and is 72 in. in height.

Standard Chemical Fire Extinguishers

The desirability of standardisation in connection with chemical fire extinguishers was brought to the notice of the British Engineering Standards Association by the Association of Liquid Chemical Fire Extinguisher Manufacturers, and as a result a standard specification has been issued. Every extinguisher must, when completed, withstand an internal hydraulic pressure of 300 lb. per sq. inch. The pressure generated in the machine under working conditions must not exceed 100 lb. per square inch and at least 95 per cent. of the fluid in the vessel must be discharged automatically. General requirements are laid down for the cap joint, cage, bottles, charge, nozzle, etc., which, while essential to the efficiency of the machine, impose no restrictions on the design.

American Chemical Society's New President

Dr. Edward C. Franklin, Professor of Organic Chemistry of Leland Stanford Junior University, has been elected President of the American Chemical Society, succeeding Dr. Edgar F. Smith, of the University of Pennsylvania. Dr. Franklin was born at Geary City, Kansas, in 1862. He graduated from the University of Kansas in 1888, and received his Master's Degree in 1890. He was a student at the University of Berlin in 1890-91; and received the degree of Doctor of Philosophy at Johns Hopkins University in 1894. He was a member of the Advisory Board of the U.S. Bureau of Mines in 1917-18; physical chemist of the U.S. Bureau of Standards and consulting chemist of the Ordnance Bureau of the Army during the war. Dr. Franklin's work on liquid ammonia as an electrolytic solvent is familiar to all chemists. In addition to his University work, he was engaged in industrial work for a number of years, serving in the sugar industry and also in the gold mining industry. In the latter work he was stationed at Miramar, Costa Rica, in 1897. Dr. Franklin was chosen from among the four nominees for President of the Society who received the largest number of votes. The ballot was sent in by mail from the various members of the Society. The choice among these four was determined by a vote of the councillors of the Society. The three other nominees were Dr. James F. Norris, of Massachusetts Institute of Technology, Samuel S. Parr, of the University of Illinois, and Dr. Charles L. Reece, Chemical Director of E. I. du Pont de Nemours and Co., of Wilmington, Delaware.

Electrolytic Zinc Production

At the annual general meeting of the Electrolytic Zinc Co. of Australasia, Ltd., held in Melbourne on October 24, the acting chairman, Mr. Montague Cohen, said that the first section of the plant came into operation at the end of November last, with a production of 20 tons of zinc per day. In a few months the anticipated production of 70 tons daily had been achieved, and it was gratifying to know that this output was being regularly maintained. The general manager (Mr. Gepp) and officers of the company had no doubt that when the total quantity of electrical energy which the hydro-electric department was under contract to supply was made available to the company the estimated output of 120 tons of zinc per day would be fully realised. The Amalgamated Zinc, the North, the South, and the Zinc Corporation, which provided the necessary large outlay of capital to start and carry on construction of the works prior to the issue of the preference shares, had so far had no interest return on their money. On present indications, however, and in anticipation of the early utilisation of the full 30,000 horse-power, he ventured to predict that the board would at a reasonably early date be in a position to make a distribution to holders of ordinary shares.

Dye and Chemical Merchants' Affairs

In the compulsory liquidation of A. T. Kremers Manufacturing Co., Ltd., import and export chemical, dye and colour merchants, 36, Great James Street, Bedford Row, London, Mr. E. T. A. Phillips, Assistant Official Receiver, has now issued to the creditors and to the shareholders a summary of the statement of affairs, which shows liabilities £2,736 expected to rank, against net assets £566, a total deficiency of £3,670 being disclosed with regard to the shareholders.

The failure of the company is attributed by Messrs. A. T. Kremers (director) and F. E. Clifford (secretary) to insufficiency of working capital, restricted credit, and general slump in trade and other causes. The liquidation remains in the hands of the Official Receiver.

Manchester Traders and the Safeguarding Act

Members of the Manchester Chamber of Commerce, who were recently asked by the Chamber for a direct answer to the question of whether they were in favour of the repeal of the Safeguarding of Industries Act and the Dyestuffs (Import Regulation) Act, have voted strongly for the repeal of both measures. The voting was as follows:—For the repeal of the Safeguarding Act, 1,306; against, 330; for the repeal of the Dyestuffs Act, 1,311; against, 304. The possible number of votes in each case was 3,787, and there were 169 spoiled papers.

French Potash

Demand for Potassic Manures Maintained

ALTHOUGH the turnover is somewhat restricted at the present time, negotiations for Spring delivery seem to indicate that, despite adverse economic farming conditions, there will be no decreased demand for potash fertilisers at planting time. According to the Agricultural Information Bureau for the French Potash Mines, present quotations for all grades are likely to remain steady, and buyers are advised to book their orders early, thereby obviating possible delay owing to transport congestion during the Spring season.

During the past month there has been a satisfactory demand for the less concentrated grades for early application to the soil. This gradually increasing practice of working in phosphatic and potassic manures some time before the crop is sown enables the best use to be made of these fertilisers, and also lightens work at the busy season. Reports from the Colonies indicate that the present low quotations are being taken full advantage of, while in America the trade remains firm. Cargoes are coming forward regularly, and this year the output from the mines in Alsace is estimated to be double that of 1921.

New Retorts and Residual Plant at Birmingham

AN important addition to the plant of the Nechells gasworks of the Birmingham Corporation, consisting of 120 vertical retorts, was brought into commission at the end of last week. Each is capable of carbonising seven tons of coal, or a total of 840 tons in 24 hours, and the total capacity of the new plant is an output of gas equal to 11,500,000 c. ft. a day. The quantities of residuals made on the new plant per day amount to 12,000 gallons of tar, 25,000 gallons of ammoniacal liquor, and 580 tons of coke and breeze, and these are dealt with on a very small area. The apparatus also includes up-to-date machinery by which 100 tons of coal per hour can be conveyed from trucks to the bunkers. The new plant has cost £600,000.

The Perkin Medal for American Chemist

THE Perkin Medal for 1922 will be presented by the Society of Chemical Industry to Dr. Milton C. Whitaker, at a meeting of the American Section to be held on January 12. Dr. Whitaker is vice-president of the U.S. Industrial Alcohol Co. and president of the U.S. Industrial Chemical Co. He was head of the Chemical Engineering Department at Columbia from 1911 to 1917, and during the greater part of this time he was also Editor of the *Journal of Industrial and Engineering Chemistry*. Born at Frazeysburg in 1870, he received his technical education at the University of Colorado. In 1902 he took a post at Columbia University under Dr. C. F. Chandler, but left in 1903 to join the Welsbach Co., in Gloucester, N.J., as chemist. He was soon made general superintendent, a position which he retained until 1910.

Detection of Small Quantities of Arsenic

A JOINT meeting of the Society of Public Analysts with the Nottingham Section of the Society of Chemical Industry will be held at the University College, Nottingham, on Wednesday, January 17, at 7.15 p.m. The chair will be taken by Mr. S. F. Burford, F.I.C., and a general discussion on "The Detection and Determination of Small Quantities of Arsenic" will be opened by Mr. A. Chaston Chapman, F.R.S., President of the Institute of Chemistry. Mr. J. M. Wilkie will read a paper on the subject; and among those taking part in the discussion will be Mr. S. R. Trotman, Mr. H. Droop Richmond, and Dr. G. W. Monier-Williams. Apparatus for the electrolytic determination of arsenic will be exhibited by Dr. G. W. Monier-Williams and Mr. J. M. Wilkie.

Cornish Radium Ore Mines

THE predictions made a few months ago as to the prospects of great developments at the Radium Ore Mines property at Tolgarrick, St. Stephens, Cornwall, received a severe check to their fulfilment through a recent action by the men for the recovery of wages due to them. A sequel to a County Court action occurred recently, when a sale of the plant and machinery of the company was held at Tolgarrick. The machinery went at reasonable prices, but much better prices were obtained for the loose plant. There were nine men involved in the action, and the claims amounted to £230.

The Nitrate Market

Estimated Position in June, 1923

IN their report on the nitrate of soda position, Aikman (London), Ltd., state that the total sales by the Producers' Association for shipment from July 1, 1922, to June 30, 1923, so far amount to about 1,400,000 English tons, of which 1,270,000 tons are for shipment up to April. Sales by the German producers before entering the association amount to about 70,000 tons, and by the American companies and two small Chilean companies not in the association to about 60,000 tons.

To what extent further sales will be made during the next six months cannot yet be reliably estimated, but a minimum of 300,000 tons would appear probable, or a minimum of 1,700,000 tons by the Producers' Association during the current nitrate year. This would amount to about 47½ per cent. of each oficina's quota on the basis of a production of 125,000 tons monthly and the above estimate of sales. Unsold stocks in Chile in producers' hands at June 30 would be about 1,145,000 tons. With the big reduction in the world's stocks and the probability of an increasing consumption, the outlook is much more favourable, and a general reopening of oficinas in the second half of next year may be expected.

The fall in the price of coal, oil, bags, etc., together with the cheapness of labour, owing to the low Chilean exchange, has reduced the cost of production, which now ranges from 5s. 9d. to 7s. 6d. per quintal. Fifty oficinas are now working, as compared with 34 at this date last year, and several others are about to reopen.

Sir S. W. Royse's Annual Review

SIR S. W ROYSS & CO., LTD., Manchester, in a review of conditions during 1922, state:—Though this year's trading has shown a considerable improvement over that of 1921, there is a feeling of disappointment that the hopes entertained twelve months ago have not been more fully realised. Business is still beset by many exceptional difficulties and has remained more or less spasmodic and chiefly for near delivery, though the level of prices is in many cases notably lower, and more stability is apparent all round. The rates of railway carriage, which were 100 per cent. over pre-war twelve months ago, are still 75 per cent. over pre-war, and further reductions are urgently needed. The concessions in the rates of postage last May were very beneficial to business. The export trade has been under the influence of adverse rates of exchange which, in some cases, notably Germany and Austria, are much worse than they were at the end of 1921. On the other hand, the improved exchange with America is a satisfactory feature, though the increased American tariff which came into force in September is impeding business. There have been some concessions made in sea freights, but figures generally are still above pre-war rates. The Safeguarding of Industries Act has now been in force over twelve months and a number of chemicals have been removed from the dutiable list, but there is a strong feeling that its working has not been satisfactory, and a committee has recently been appointed by the Government to investigate the matter scientifically. The import trade has also been hampered by considerable delays in shipments from the Continent. There is reasonable ground for hope that success will attend the special efforts being made to settle the various international questions which are hindering trade, and that there may be some better times in the new year.

Disposal of Reparation Dyes in India

IN his annual report for 1921-22 the Director of Industries, Bombay, mentions the duty which was allotted to him of controlling the disposal of German dyes taken over under the reparation clauses of the Peace Treaty. He states that with the exception of a small allotment of a particular class of alizarine dye assigned to the Madras Presidency, all synthetic dyes allotted to India were sold through two firms in Bombay under his supervision. The work had been carefully organised in the preceding year and at first ran on routine lines, but, owing to the subsequent slump in prices and confused market conditions, the business later required much attention. The Director of Commercial Intelligence at Bombay took over the distribution in February last.

From Week to Week

THE SCARAB OIL BURNING CO., LTD., have removed to new offices at Carlton House, Regent Street, London, S.W.1.

OVER 10,000 TONS of sodium nitrate are to be sold by auction next week by the United States War Department.

THE GERMAN ANILINE COMBINE is reported to have increased prices of all dyestuffs by from 50 to 75 per cent. to domestic consumers.

SIR WILLIAM J. POPE lectured on "Crystalline Liquids" at the Science Masters' Conference at Cambridge on Wednesday.

RESOLUTIONS passed at a recent meeting of the American Institute of Chemical Engineers recorded the Institute's opposition to the licensing of chemical engineers.

SIR JOSEPH TURNER, in an article in the *Financial News*, emphasises the necessity of manufacturing aniline dyestuffs in this country right from the coal tar to the finished article.

THE TELEGRAPHIC ADDRESS of the London offices of Thos. Forth and Sons, Ltd. (Norfolk Works, Sheffield), at 8, The Sanctuary, S.W.,1, has been changed from "Mesmeric, Vic" to 'Mesmeric, Parl."

ACETIC ACID in fairly large quantities is being imported into Ceylon for use in coagulating crude rubber. During and immediately subsequent to the war Japan maintained a practical monopoly in this commodity.

Mr. C. E. BEST, speaking at the annual meeting of Oilfields of England, Ltd., on December 29, affirmed the directors' confidence in the Kelham oilfield and referred to large concessions which had been acquired in Spain.

A RECENT FEATURE of the nitrate market, Messrs. Henry Bath and Son state in their half-yearly report, has been the re-establishment of a c.i.f. market for cargoes, which have been changing hands in gradually increasing volume.

MR. ROBERT SADLER, a director of Sadler and Co. (Glasgow,) Ltd., soap manufacturers, died at Sudbrooke, 180, Nithsdale Road, Pollokshields, on December 29. The interment took place on Tuesday at Eastwood Cemetery, Glasgow.

IN AN ARTICLE in the *Liverpool Post* Sir Max Muspratt describes the immediate outlook for chemical industry as satisfactory and expresses the opinion that a continuance of the improvement noted in 1922 may be anticipated.

AN ASSOCIATION is being formed of those interested in bringing about the repeal of the Safeguarding of Industries Act, "or, at least, remedying the anomalies in the Act and freeing British trade from the trammels of bureaucracy."

DR. W. ROSENHAIN, of the National Physical Laboratory, is sailing about the end of the month for the United States, where he has arranged a lecture tour embracing practically all the universities and educational organisations in the Eastern States.

AT THE FOURTH annual house dinner of the International Icilma Trading Co., Ltd., held at the Connaught Rooms, London, on December 29, it was announced that Viscount Leverhulme had obtained a controlling interest in the concern.

A VERDICT of "accidental death" was returned at an inquest at Brighton, on December 27, on the body of Mr. Arthur H. Cox, eldest son of Mr. Arthur H. Cox, managing director of Arthur H. Cox & Co., manufacturing chemists, Brighton.

MR. B. LESLIE EMSLIE, a Glasgow man, has been appointed publicity manager to the Chilean Nitrate Committee for Canada. He was associated with the German Potash Syndicate for some years, and has assisted in potash propaganda in several countries.

A DEMONSTRATOR with special qualifications in organic chemistry is required by January 15 for the chemical department of the East London College, University of London. Particulars of the appointment are obtainable from the registrar, Mr. E. J. Wignall.

Mr. H. O. CHALKLEY, Commercial Secretary to H.M. Legation at Buenos Aires, will be in attendance at the Department of Overseas Trade for a few days from January 18, 1923, and will be pleased to interview chemical manufacturers and merchants interested in trade with Argentina.

THE OFFICIAL British scheme for a general settlement of reparations includes a clause to continue the Treaty obligations on Germany to make deliveries of dyestuffs, etc., to the Allies. In the French proposals it is estimated that in regard to nitrates the total product of the pledges contemplated will amount to about £3,000,000.

DAMAGE, estimated at £20,000, was caused by a fire last week in the Cyro ink works, Holland Street, Glasgow, occupied by Farquharson Brothers, Ltd., typewriter ribbon and stencil paper manufacturers. The firm is the only one of its kind in Scotland, and a large amount of valuable machinery has been destroyed.

AMONG THE OPERATIONS illustrated at the Scientific Novelties Exhibition at King's College, London, are glass blowing, the use of thermit, the extraction of oils, and electrolysis Lecturing on Tuesday at the Exhibition, Professor H. Wilson pointed out that ozone and nitrogen could be obtained from the air by means of high tension discharges.

IT HAS BEEN DECIDED to form a Scientific Expeditionary Research Association to act in conjunction with scientific societies for the purpose of facilitating and promoting scientific research by means of expeditions to all parts of the world. Sir J. K. D. Mackenzie presided at the inaugural meeting which was held at Burlington House, London, on Wednesday.

THE CHEMICAL SECTION at the British Empire Exhibition has been allotted 25,000 sq. ft. of floor space. A large number of chemical manufacturers have already applied for space and it is probable that a portion of the section will be devoted to perfumery. Suggestions have also been received from firms desiring to show the whole process of manufacturing toilet soap and other toilet preparations by modern machinery.

AT THE INQUEST on the Bethnal Green gas-poisonng victims the Coroner said the question occurred as to whether it was possible to lessen the poisonous ingredients in gas or to introduce an irritant which would give rise to an irritating cough to awake the sufferer, who might be asleep, during the escape of gas. It would have to be something that could be burned up and rendered harmless when used in the ordinary way.

THE COURT of the University of Leeds, at its last meeting, recorded its profound regret at the retirement of Professor Smithells, after thirty-seven years' service as head of the Chemistry Department at the University, to devote himself to scientific investigation in London. In his review of the year's work, the pro-Chancellor said that one of their most interesting experiments was the establishment of the laboratory for silk research.

THE NEW YEAR HONOURS LIST contains the following:—K.B.E. (Civil Division): Dr. D. O. Masson, Professor of Chemistry in the University of Melbourne; and Dr. J. W. Evans, F.R.S., of the governing body of the Imperial Mineral Resources Bureau. Mr. Thomas Paxton, Lord Provost of Glasgow, who receives a Baronetcy, will be remembered for the keen interest he displayed in the last annual meeting of the Society of Chemical Industry in Glasgow.

A GIFT of £2,600 to be paid in instalments of £400 a year over a period of 6½ years, has been made by the directors of Ashton and Parsons, Ltd., to Guy's Hospital. The gift is to be spent in research on diabetes mellitus and other related diseases of metabolism, in the Medical Investigation Department of the Guy's Hospital Medical School. The money will be used to found a Parsons Fellowship in connection with this research. The gift will provide for the services of an additional worker to aid in the investigations into the preparation and use of insulin, the new substance discovered at Toronto University. Guy's Hospital is one of the institutions at which combined research on this subject is being undertaken under the auspices of the Medical Research Council.

PROFESSOR LACROIX, Permanent Secretary of the French Academy of Science, stated, according to a *Times* correspondent, that Madagascar has uraniferous deposits which are capable of producing in the near future 45 to 60 grains of radium bromide per annum, which is about half the present world's annual supply of radium. Ten tons of "Betafite"—the name given by Professor Lacroix to deposits found in the Betafo district of Madagascar—furnish 15 grains of radium bromide. He adds that the crystals from which radium bromide is obtained are found conveniently in red earth, and may be extracted by washing, as is done in the case of gold-bearing deposits. The exploitation in Madagascar is still in its infancy, and anybody can take part in it by pegging out a claim.

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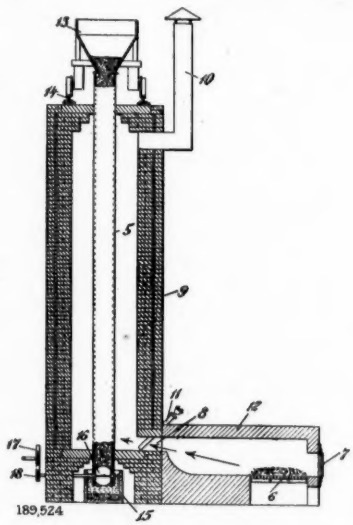
Patent Literature

Abstracts of Complete Specifications

189,523–4–5. LITHOPONE, MANUFACTURE OF. H. G. C. Fairweather, London. From New Jersey Zinc Co., 160, Front Street, Manhattan, New York. Application date, August 30, 1921.

189,523. The object is to obtain lithopone of improved covering power, oil absorption, and resistance to light. Lithopone is usually produced by the interaction of zinc sulphate and barium sulphide in the presence of an electrolyte, usually sodium chloride, in excess of 5 grams of chlorine per litre of zinc sulphate solution of 20° Bé. It is now found that the strength or covering power of the lithopone depends upon the relation between the amount of chlorine present in the liquor during precipitation and the temperature at which the crude lithopone is subsequently heated in a muffle. A decrease in the percentage of chlorine corresponds to an increase in the muffle temperature necessary. A variation in the chlorine content of 1 to 9 grams per litre corresponds to a variation in the muffle temperature of 800° C. to 600° C. It is also found that there is a critical light resisting temperature which depends upon the chlorine content of the precipitating solutions, but rises much more rapidly than the critical strength temperature. The critical light resistance temperature of lithopone precipitated in the presence of 9 grams of chlorine per litre is considerably below the corresponding


189,524

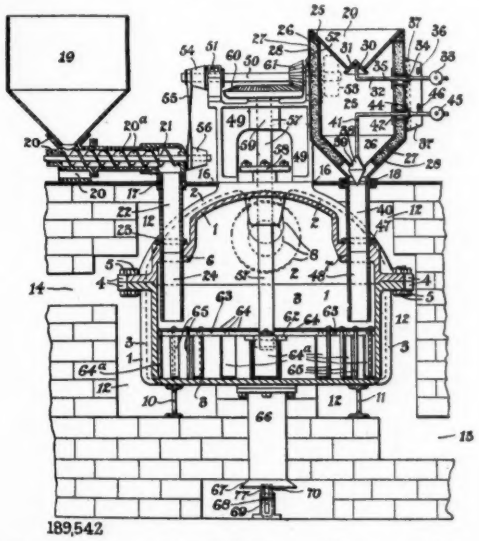
strength temperature, but these temperatures are practically the same for a chlorine content of 1 gram per litre. A lithopone having good strength and light resisting power may thus be obtained with a muffle temperature of 800° C. It is also found that the oil absorption of lithopone gradually increases as the proportion of chlorine in the precipitating solution decreases. Lithopone having the optimum properties for pigment purposes can be obtained by the use of about 1 gram of chlorine per litre of 20° Bé. zinc sulphate solution, and a muffle temperature of about 650°–800° C. The muffling process is preferably carried out in the apparatus described in Specification Nos. 189,524–5 (below). It is found that very slight oxidising action during the muffling operation results in the formation of appreciable amounts of zinc oxide, so that air or oxidising gases must be excluded. The presence and amount of zinc oxide may be determined by solution in acetic acid, and in the present process this may be reduced to 0·3 to 0·4 per cent. The absence of zinc oxide increases the light resisting power, and it is found that this may be tested by its appearance in ultra violet light. The darkening of lithopone when subjected to sunlight is attributed to the ultra violet rays, and lithopone manufactured by the usual process is found to be strongly fluorescent in ultra violet light, but the product obtained by the present process is practically inactive, and corresponds to the inactivity of the crude untreated lithopone.

189,524. This apparatus is for heating crude lithopone to uniform temperature in the absence of air and by a continuous operation. The lithopone is fed from a hopper 13 to a vertical muffle 5, through which it passes by gravity and without agitation. It is found that there is a relation between the length and cross section of the muffle which must be maintained to obtain a uniform product. It is preferred to use an iron tube 25 ft. in length and 10 in. in diameter; it is found that if the diameter is increased to 12 in. the product is not uniform. The retort is heated by combustion gases from a furnace 6, which pass through the flue 8 into the heating chamber 9. The retort setting is constructed of large heat capacity to obtain uniform heat conditions. The lower end of the retort projects into a water tank 15, through which water passes continuously, and the muffled lithopone is discharged at a predetermined rate by a rotary valve 16, which is operated periodically by gearing 17, 18. The upper part of the retort 5 forms the pre-heating zone, in which occluded air is expelled by the rising gases, so that the atmosphere in the lower part of the retort is non-oxidising. Preliminary drying of the crude lithopone to the extent usually adopted is not necessary in this apparatus.

189,525. This specification describes an arrangement of plant for the manufacture of lithopone. A number of vertical retorts are surrounded by separate heating flues for hot combustion gases, which are received from a common heat equalising chamber connected to the combustion chamber of the furnace. The heat equalising chamber is provided with a number of passages of large surface area formed of a large mass of refractory material. The retorts may have a central zone, the walls of which are inclined outwards, and top and bottom zones with parallel walls. The gases driven off are allowed to escape from the top of the retorts at such a rate that a pressure slightly above atmospheric is maintained in the retorts.

189,542. DISTILLING OIL SHALES, COAL AND OTHER CARBONACEOUS MATERIALS, PROCESS AND APPARATUS FOR. T. G. Ironside, 21, Warrender Park Terrace, Edinburgh. Application dates, September 1 and October 19, 1921; January 11, January 30 and February 20, 1922.

The apparatus is for distilling oil shale, coal, lignite, sawdust, wood, etc., or liquid carbonaceous materials. The heat is applied to the carbonaceous material by the addition of pre-heated granular or fragmentary material, and also through the walls of the retort. The retort 1 is provided with an inlet 6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for shale or the like, which is fed from a hopper 19 by a screw conveyor 20^a, and with an inlet 7 for the granular heating medium which is fed from a hopper 25. The retort is arranged in a brickwork setting and is surrounded by a space 12 for the circulation of a gaseous heating medium. The hopper 25

comprises inner and outer casings 26, 27, enclosing heat insulating material. The material passes automatically into the chamber 25 as soon as the pressure on the valve 30 is sufficient to counterbalance the weight 33, while a similar counterweighted valve 38 is provided to discharge the material into the retort. The retort contains a rabbling device mounted on a shaft 57, which is driven by bevel gearing 60, 61. The lower end of the shaft carries four radial arms 63, supporting blades 64^a and pins 65 projecting nearly to the bottom of the retort. The rabble mixes the shale and hot sand or the like, and gradually transfers it to a central outlet 66. The granular heating medium may be pre-heated by passing it downwards through a flue containing hot gases and provided with a number of horizontal baffles. In another apparatus steam or hot gases may be injected into the material in the retort through the hollow vertical shaft. An alternative form of retort is described in which the carbonaceous material and granular material gravitate downwards over a series of superposed shelves, and a temperature gradient is maintained in the retort.

189,561. Chlorination of Cellulose Materials, Process for Dissolving by Means of Alkalis, the Organic Products obtained by. A. R. de Vains, 10, Rue Henri Grosbon, Miribel, Ain, France. Application date, September 5, 1921.

Ligno-cellulose lixiviated with alkali and then chlorinated absorbs chlorine in proportion to the number of ketone groups in its formula. These organic chlorides, or the oxidation products obtained by the action of chlorine on cellulose, dissolve in alkaline lye, liberating cellulose, but a fresh quantity of lye is necessary for each operation, and the excess of alkali is liable to give the cellulose a reddish tint. In the present invention, lye which has been used for lixiviation of cellulose material is used as a solvent and the cellulose obtained is free from colour.

189,698. Monazite and Other Phosphate Ores, Process for the Treatment of. Soc. Minière & Industrielle Franco-Bresilienne, 20, Boulevard Montmartre, Paris. International Convention date, December 29, 1921.

In the usual process for the treatment of monazite ore containing thorium and rare earths by means of sulphuric acid, the thorium is obtained as phosphate, but the elimination and recovery of the phosphoric acid are difficult. In the present process, the phosphoric acid is eliminated before the separation of the thorium from the rare earths while the phosphoric acid is itself recovered. The ore is treated with 1·5 parts of concentrated sulphuric acid and the resulting mass mixed with its own volume of cold concentrated sulphuric acid. The thorium and rare earths are precipitated as anhydrous sulphates and bisulphates, and the phosphoric acid is liberated in the form H_3PO_4. The acid liquor is separated by vacuum or pressure filters, or by a centrifugal apparatus, and the residual phosphoric acid is washed out from the sulphates by means of cold concentrated sulphuric acid. The first liquor separated contains most of the phosphoric acid, and may be used for the preparation of phosphoric compounds. The sulphuric acid used for washing may then be used for treating a further quantity of ore. The mixed sulphates of thorium, cerium, and other rare earths, may then be separated by known means. In a modified process the ore is treated with concentrated sulphuric acid as before, and then added gradually to sulphuric acid of a concentration of 15° Bé. until the concentration of the liquor is 42°-45° Bé. Hydrated crystalline sulphates are precipitated, containing about 30 per cent. of the thorium, and are then separated mechanically and treated for the recovery of their constituents. The remaining solution is mixed with the recovered thorium oxide from the crystalline salts, and the water is evaporated until thorium sulphate is precipitated. This is separated mechanically and washed with cold concentrated sulphuric acid. The division of the process into two stages facilitates the separation of the precipitated salts which are in a hydrated state, while less sulphuric acid is required, and the liquor is richer in phosphoric acid.

189,700. Titanium Dioxide and Vanadium Salts from Bauxite, Process for the Extraction of. E. E. Dutt, 7, Vicarage Gate, Kensington, London. Application date, February 10, 1922.

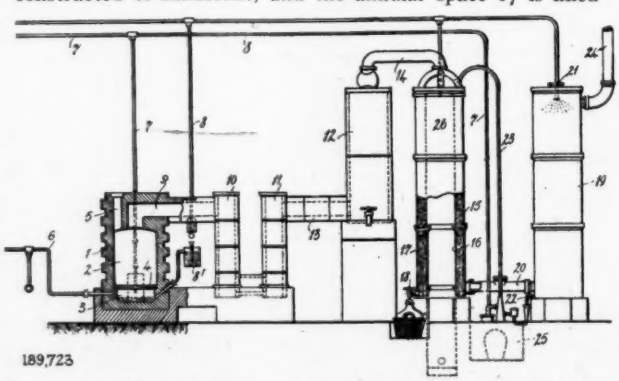
Bauxite containing titanium and vanadium is treated with a solution of caustic soda under pressure by the Bayer process. A solution of sodium aluminate is thus obtained, from which pure alumina may be recovered. The insoluble residue, containing iron, vanadium and titanium, is washed and dissolved in hydrochloric acid. The solution of chlorides is neutralised with soda ash, caustic alkali or lime, and the ferric chloride then reduced by means of sulphur dioxide or by electrolysis. This solution could be boiled to precipitate titanium dioxide by hydrolysis, but it is difficult to obtain the dioxide in granular form. If the solution is boiled in the presence of an alkali acetate, it is found that the precipitated dioxide is in the form of a very fine granular powder, which is then filtered off. The titanium dioxide thus obtained is particularly suitable for the manufacture of pigments, and contains only a trace of iron oxide. The remaining solution containing chlorides of iron, vanadium, aluminium, and sodium or calcium, is treated with a soluble barium salt to precipitate barium vanadate, from which vanadium oxide may be obtained.

189,706. Finely subdivided solid substances, Process for the production of. Th. Goldschmidt A.-G., 18, Salkenbergsweg, Essen-Ruhr, Germany, and V. Kohlschütter, 19A, Buhlstrasse, Berne, Switzerland. Application date, February 27, 1922.

Solid substances may be obtained in a state of very fine dispersion by vaporising them and then condensing the vapour in the form of fumes. The finely divided solid particles are then precipitated by electrostatic separation. The process is applicable to all substances which can be volatilised and recondensed, and also to substances which are oxidised as the result of vaporisation, and the oxide then condensed. The oxides of certain heavy metals may be obtained by producing them together with other oxides in the form of fumes—*e.g.*, by subjecting compounds or alloys of the metals with aluminium, titanium, tin, silicon, vanadium, etc., to a blowing process. Very active catalysts may thus be obtained. The metal oxides may be obtained by melting the metal or its carbide in the electric arc and passing the vapour to an oxidising chamber and then to an electric precipitator. Examples are given in which very highly dispersed oxide of tin is obtained, the product being suitable as an opalising agent for glass and enamel. When ferro-titanium or ferro-vanadium is treated in this manner, and the product reduced in hydrogen, a pyrophoric substance is obtained.

189,723. Hydrochloric Acid in Aqueous Solution, Plant for the Synthetic Manufacture of. G. Poma and G. Andreani, Cesano Maderno, Milan, Italy. Application date, May 19, 1922.

The apparatus is for the manufacture of hydrochloric acid by the action of chlorine and water vapour on incandescent coke. Coke is fed through a passage 5 into the upper part 2 of a furnace, and chlorine is supplied through a pipe 6 to the lower part 3 below the grate 4. Air for promoting combustion of the coke is supplied by a pipe 7, and water by a pipe 8. The hydrochloric acid gas generated passes through the passage 9 to cooling towers 10, 11, 12, and then to a condensing tower 26. This consists of two cylinders 15, 16 constructed of sandstone, and the annular space 17 is filled



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with contact material over which a dilute solution of hydrochloric acid flows. The tower is kept cool by water flowing over the outside of the walls. The residual gas containing some hydrochloric acid passes through a pipe 20 to a tower 19,

where it is treated with a water spray 21 to recover the hydrochloric acid. The dilute solution thus obtained is then supplied to the top of the tower 17, where it absorbs more hydrochloric acid gas.

NOTE.—Abstracts of the following specifications, which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention :—184,153 (Chemische Fabrik Weissenstein Ges.), relating to the manufacture of hydrogen peroxide, see Vol. VII., p. 504 ; 187,232 (Chemische Fabrik in Billwarder vorm. Hell und Sthamer Akt.-Ges., and P. Hasenclever), relating to the production of chrome alum, see Vol. VII., p. 943.

International Specifications not yet Accepted

188,311. LITHOPONE. New Jersey Zinc Co., 160, Front Street, Manhattan, New York. (Assignees of F. G. Breyer, Palmerton, Pa., U.S.A., and C. W. Farber, Bowmanstown, Pa., U.S.A.) International Convention date, November 2, 1921.

Lithopone is produced by precipitation using an excess of barium sulphide, to obtain a small proportion of alkali in the final product, and thus render the lithopone easily assimilable with paint vehicles.

188,338. CHROME ALUM. Kinzlberger and Co., 38, Národní třída, Prague, Czecho-Slovakia. International Convention date, November 4, 1921.

Ferro-chromium is dissolved in sulphuric acid, and calcium carbonate is added in sufficient quantity to precipitate only part of the chromium, which is thus obtained free from iron. The precipitate is dissolved in sulphuric acid and mixed with potassium sulphate to obtain chrome alum. The remaining chromium and some iron are then precipitated by adding more calcium carbonate and the precipitate dissolved in sulphuric acid. This is added to the sulphuric acid used for treating a fresh quantity of ferro-chromium.

LATEST NOTIFICATIONS.

190,694. Method of making cellulose compounds. Nitrogen Corporation. December 23, 1921.
190,707. Apparatus for separating solids from liquids. Soc. Générale d'Evaporation Procédés Prache et Bouillon. December 20, 1921.
190,723. Installations and devices for the distillation and depolymerisation of liquid or liquefiable hydrocarbons. Seigle, A. A. F. M. December 22, 1921.
190,727. Method of and apparatus for the treatment of pulps. Dorr Co. December 22, 1921.

Specifications Accepted, with Date of Application

174,908. Metallic compounds from ores, Manufacture of. J. D. Gat. February 2, 1921.
190,194. Centrifugal filters. F. Lamplough and M. C. T. Harper. September 16, 1921.
190,203. Coal gases, Recovery of valuable products from. J. Y. Johnson. (*Badische Anilin & Soda Fabrik.*) August 17, 1921.
190,212. Ores, metallurgical products, and other materials, Process for the continuous leaching of—on the counter-current principle. A. L. Mond. (*Metallbank und Metallurgische Ges. Akt.-Ges.*) September 10, 1921.
190,237. Tungstic oxide, Method of and apparatus for automatically producing—in a dried and powdered condition. British Thomson-Houston Co., Ltd. (*General Electric Co.*) September 14, 1921.
190,246. Copper ores, Treatment of. W. G. Perkins. September 16, 1921.
190,269. Cellulose acetates, Treatment of. British Cellulose and Chemical Manufacturing Co., Ltd. (*American Cellulose and Chemical Manufacturing Co., Ltd., Inc.*) September 7, 1921.
190,284. Hydrocarbons, Cracking and hydrogenating. G. F. Forwood and J. G. Taplay. October 7, 1921.
190,286. Water soluble compounds of diethyl-barbituric acid and phenyl-ethyl barbituric acid and process of manufacturing the same. H. Sefton-Jones. (*J. A. Wulfing, Firm of.*) October 8, 1921.
190,313. Dyeing cellulose acetates. Burgess, Ledward & Co., Ltd., and W. Harrison. October 27, 1921.
190,314. Sugar, Process for the extraction of—and purification of sugar solutions. Plauson's (Parent Co.), Ltd. (*H. Plauson.*) October 28, 1921.
174,041. Ammonia, Apparatus for the synthesis of. L'Air Liquide Soc. Anon. pour l'Etude et L'Exploitation des Procédés. G. Claude. January 14, 1921.

Applications for Patents

Akt.-Ges. Brown, Boveri, et Cie. Mercury-vapour rectifiers. 35442. December 29. (Germany, January 19.)
Babcock and Wilcox, Ltd. (Deutsche Babcock and Wilcox Dampfkessel-Werke Akt.-Ges.). Pulverizers for coal, etc. 35286, 35290. December 28.
Baddiley, J., British Dyestuffs Corporation, Ltd., and Tatum, W. W. Dyeing acetyl silk. 34894. December 21.
Best, G., and Williams, M. Dry scrubber for production of gases. 35366. December 29.
Blicquy, J. de. Dyeing, etc., machines. 35130. December 27.
British Dyestuffs Corporation, Ltd. Intermediate compound. 34483. December 18.
Clapham, H. W., Nobel's Explosive Co., Ltd., and Nolan, T. J. Production of tetryl, etc. 34738. December 20.
Edwards, G. W. Treatment of oxidised copper ores, etc. 35221. December 27.
Etablissements Poulenc Frères and Oechslin, C. Manufacture of hydroxylated aliphatic arsenic acids. 34890. December 21. (France, December 29, 1921.)
Etablissements Poulenc Frères and Oechslin, C. Manufacture of aliphatic arsenical compounds. 34891. December 21. (France, December 30, 1921.)
Green, K. Manufacture of cellulose acetate. 34772. December 20.
Imray, O. Y. (Soc. of Chemical Industry in Basle). Manufacture of N-mono- and poly- carboxylic acid esters of asymmetrically-substituted alkylenediamines. 35500. December 30.
Lantz, R. (Soc. Anon des Matieres Colorantes et Produits Chimiques de Saint-Denis and Wahl, A.). Manufacture of 1-phenylimino-2-naphthaquinone. 35328. December 28. (Germany, December 29, 1921.)
Ormandy, W. R. Manufacture of fuel briquettes. 34643. December 19.
Plauson, H., and Plauson's (Parent Co.), Ltd. Manufacture of starch preparations. 35036. December 23.
Seigle, A. A. F. M. Installations for distillation and depolymerisation of hydrocarbons. 34745. December 20. (France, December 22, 1921.)
South Metropolitan Gas Co. and Weight, O. W. Distillation of ammoniacal liquors. 34479. December 18.
Thermal Industrial and Chemical (T.I.C.) Research Co., Ltd. Apparatus for heat-treatment by molten metal. 35502. December 30.

British Burmah Petroleum Production

PRESIDING on December 29 at the annual meeting of the British Burmah Petroleum Co., Ltd., Mr. Lionel Holland (the chairman) said that the company's production of crude oil had been satisfactorily increased to a net production of 780,825 barrels for the year—an increase of over 120,000 barrels—and it had kept their refinery supplied to its present full capacity. The throughput of their refinery has been scarcely less satisfactory—1,817 barrels a day average, against 1,560 for the preceding twelve months. It was to the credit of their refinery manager and his staff that the throughput had been so well maintained, in spite of their having been engaged during the year upon new construction in replacing by new installations much of their old plant, which they had had to nurse tenderly to achieve these results. Their shipments and sales of benzene and of wax had exceeded in quantity those of any previous year.

The company shipped over 16,500 tons of benzene—an improvement of over 2,000,000 gallons—and over 700 tons more wax than before. But following upon a fall in the preceding financial year, a heavy drop occurred during the early months of last year in the selling price of benzene, while the price of wax dropped to a wholly unremunerative figure. Benzene, wax and fuel oil were the commodities which had suffered most in the fall of prices. They represented about 40 per cent. of the total output of the company's refinery.

The company was faced with abnormally high working costs, chiefly owing to the increased wages of unskilled labour, and to the casing and drilling material being purchased before the drop in engineering prices, and to the heavy cost of the deep drilling now needed to reach new production. At the same time, their new plant for the supply of fresh water to the Yenangyaung Fields, which began to operate last January, was effecting a marked reduction in fuel costs, and they anticipated also a reduction in fuel consumption at the refinery now that the erection of the new distillation bench had been completed.

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers ; those interested in close variations in prices should study the market report.*

LONDON, JANUARY 4, 1923.

STEADY conditions have ruled during the past week. The uptake of goods has been, of course, restricted, owing to the annual stocktaking, but the general trend of things is exceptionally firm. There cannot be any question but that the outlook is far brighter than at this time last year.

The export demand is fair, and there are more inquiries in the market than for some time past.

General Chemicals

ACETONE is as firm as ever, and is particularly scarce for this month's delivery.

ACID ACETIC is a fairly active market, and with the absorption of second-hand stocks higher prices are being realised.

ACID CITRIC.—A better business is reported. Price unchanged.

ACID FORMIC is only moderately called for. The price seems to be depressed for the moment by cheap offers on realisation account.

ACID LACTIC.—Unchanged.

ACID OXALIC.—An active business is passing. Stocks are very low, and the tendency is decidedly better.

ACID TARTARIC.—Unchanged.

ARSENIC is in good inquiry in all positions. Makers are well sold and supplies for early delivery command a high premium.

BARIUM CHLORIDE.—Stagnant.

CREAM OF TARTAR.—Unchanged.

FORMALDEHYDE is again firmer. Price seems likely to advance still further.

LEAD ACETATE.—In fair demand. Price unchanged.

METHYL ALCOHOL is very scarce both for prompt and forward delivery.

POTASSIUM CARBONATE remains uninteresting.

POTASSIUM CAUSTIC.—Tendency is still in buyers' favour.

POTASSIUM PERMANGANATE.—The firm tendency is maintained, and a fair business is reported.

POTASSIUM PRUSSIATE is scarce and firm in all positions.

SODIUM ACETATE remains short. Price still maintained.

SODIUM NITRITE.—Unchanged.

SODIUM PRUSSIATE remains a firm market, and the limited supplies are immediately absorbed.

Pharmaceutical Chemicals

ACETYL SALICYLIC ACID.—Spot is very firm and may be expected to advance.

ACETANILID has been in steady demand at last prices.

ACID TANNIC LEVISS has been in good demand. The market is steady and unchanged.

HEXAMINE is advancing.

HOMATROPINE is easier in sympathy with the lower prices quoted for atropine.

METHYL SULPHONAL is offered at lower prices.

MILK SUGAR is in good demand. Manufacturers have advanced their prices.

PARALDEHYDE.—A fair business has been done at last values.

PHENOLPHTHALEIN is slightly easier on arrival of fresh imports.

RESORCINE continues weak on account of Continental competition.

VANILLIN is again weaker.

Coal Tar Intermediates

Business seems to have picked up a little since the holidays ; more inquiry is about, and several orders have been placed.

ALPHA NAPHTHOL is firm with stocks short.

ALPHA NAPHTHYLAMINE.—Following a reduction in price some fair orders have been placed.

ANILINE OIL.—Export and home inquiries are in the market.

BENZIDINE BASE is uninteresting on export account, but some home business has been placed.

BETA NAPHTHOL has been a little more interesting.

BETA NAPHTHYLAMINE is featureless.

DIMETHYLANILINE is steady and has been the object of some home interest.

DIPHENYLAMINE is firm.

H. ACID is in demand on home account.

PARANITRANILINE.—Prices are slightly easier, and some home business has been received.

R. SALT.—Some fair inquiries are in the market.

Coal Tar Products

The market in coal tar products maintains a very firm tone, and most prices have an upward tendency. This does not apply to benzols and solvents, however.

90's BENZOL is plentiful, and there is no great demand. It is worth about 1s. 7d. to 1s. 8d. per gallon on rails in the North, and 1s. 11d. to 2s. per gallon in London.

PURE BENZOL has a poor demand, and is quoted from 2s. to 2s. 2d. per gallon on rails in the North, and from 2s. 4d. to 2s. 6d. per gallon in London.

CREOSOTE OIL maintains a firm tone, and is worth about 7d. per gallon on rails in the North, and about 7⅞d. to 8¼d. per gallon in London.

CRESYLIC ACID is plentiful, and the dark quality is quoted at about 1s. 9d. per gallon on rails, while the pale quality, 97/99%, is worth about 1s. 11d. to 2s. per gallon. There is a slightly better demand for this product.

SOLVENT NAPHTHA is steady at about 1s. 7d. per gallon on rails in the North, without having any very active inquiry. It is worth about 1s. 10d. to 2s. per gallon in London.

HEAVY NAPHTHA is quiet, and is worth about 1s. 6d. per gallon on rails.

NAPHTHALENES are slightly easier, and without much fresh inquiry. The crude and whizzed qualities with lower melting points are worth from £5 to £7 per ton, while hot pressed is worth about £8 10s. per ton.

PITCH.—The market is very firm, and sellers scarce. To-day's quotations are 130s. to 132s. 6d. f.o.b. East and West Coasts, and 132s. 6d. to 135s. f.o.b. London.

Sulphate of Ammonia

The home trade position shows little change, and there is still a good demand for export.

Current Prices

General Chemicals

	Per	£	s.	d.		£	s.	d.
Acetic anhydride	lb.	0	1	5	to	0	1	7
Acetone oil	ton	80	0	0	to	82	10	0
Acetone, pure	ton	130	0	0	to	135	0	0
Acid, Acetic, glacial, 99–100%	ton	67	0	0	to	68	0	0
Acetic, 80% pure	ton	44	0	0	to	45	0	0
Arsenic, liquid, 2000 s.g.	ton	67	0	0	to	70	0	0
Boric, cryst.	ton	55	0	0	to	60	0	0
Carbolic, cryst. 39–40%	lb.	0	0	7	to	0	0	7½
Citric	lb.	0	1	9	to	0	1	10
Formic, 80%	ton	57	0	0	to	59	0	0
Hydrofluoric	lb.	0	0	7½	to	0	0	8½
Lactic, 50 vol.	ton	41	0	0	to	43	0	0
Lactic, 60 vol.	ton	43	0	0	to	44	0	0
Nitric, 80 Tw.	ton	27	0	0	to	29	0	0
Oxalic	lb.	0	0	7½	to	0	0	7½
Phosphoric, 1.5	ton	40	0	0	to	42	0	0
Pyrogallic, cryst.	lb.	0	5	9	to	0	6	0
Salicylic, Technical	lb.	0	1	0	to	0	1	2
Sulphuric, 92–93%	ton	6	10	0	to	7	10	0
Tannic, commercial	lb.	0	2	3	to	0	2	9
Tartaric	lb.	0	1	2½	to	0	1	3

	Per	£	s.	d.		£	s.	d.
Alum, lump	ton	13	0	0	to	13	10	0
Alum, chrome	ton	28	0	0	to	29	0	0
Alumino ferric	ton	9	0	0	to	9	5	0
Aluminium, sulphate, 14–15%	ton	10	10	0	to	11	0	0
Aluminium, sulphate, 17–18%	ton	11	10	0	to	12	0	0
Ammonia, anhydrous	lb.	0	1	6	to	0	1	8
Ammonia, .880	ton	33	0	0	to	35	0	0
Ammonia, .920	ton	21	0	0	to	23	0	0
Ammonia, carbonate	lb.	0	0	4	to	0	0	4½
Ammonia, chloride	ton	50	0	0	to	55	0	0
Ammonia, muriate (galvanisers)	ton	35	0	0	to	37	10	0
Ammonia, nitrate (pure)	ton	35	0	0	to	40	0	0
Ammonia, phosphate	ton	65	0	0	to	68	0	0
Ammonia, sulphocyanide	lb.	0	1	10	to	0	2	0
Amyl acetate	ton	175	0	0	to	185	0	0
Arsenic, white, powdered	ton	70	0	0	to	75	0	0
Barium, carbonate, 92–94%	ton	15	0	0	to	16	0	0
Barium, Chlorate	ton	65	0	0	to	70	0	0
Barium Chloride	ton	18	0	0	to	19	0	0
Nitrate	ton	35	0	0	to	38	0	0
Sulphate, blanc fixe, dry	ton	20	10	0	to	21	0	0
Sulphate, blanc fixe, pulp	ton	10	5	0	to	10	10	0
Sulphocyanide, 95%	lb.	0	1	0	to	0	1	3
Bleaching powder, 35–37%	ton	11	0	0	to		—	
Borax crystals	ton	28	0	0	to	32	0	0
Calcium acetate, Brown	ton	10	10	0	to	11	10	0
,, ,, Grey	ton	15	10	0	to	16	0	0
Calcium Carbide	ton	16	0	0	to	17	0	0
Chloride	ton	6	0	0	to	7	0	0
Carbon bisulphide	ton	50	0	0	to	52	0	0
Casein technical	ton	98	0	0	to	105	0	0
Cerium oxalate	lb.	0	3	0	to	0	3	6
Chromium acetate	lb.	0	1	1	to	0	1	3
Cobalt acetate	lb.	0	6	0	to	0	6	6
Oxide, black	lb	0	9	6	to	0	10	0
Copper chloride	lb.	0	1	2	to	0	1	3
Sulphate	ton	27	10	0	to	28	10	0
Cream Tartar, 98–100%	ton	100	0	0	to	102	0	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde, 40% vol.	ton	90	0	0	to	95	0	0
Formusol (Rongalite)	lb.	0	2	6	to	0	2	9
Glauber salts, commercial	ton	5	0	0	to	5	10	0
Glycerin, crude	ton	65	0	0	to	67	10	0
Hydrogen peroxide, 12 vols.	gal.	0	2	4	to	0	2	5
Iron perchloride	ton	30	0	0	to	32	0	0
Iron sulphate (Copperas)	ton	3	10	0	to	4	0	0
Lead acetate, white	ton	43	0	0	to	45	0	0
Carbonate (White Lead)	ton	42	0	0	to	47	0	0
Nitrate	ton	44	10	0	to	45	0	0
Litharge	ton	35	10	0	to	36	0	0
Lithopone, 30%	ton	22	10	0	to	23	10	0
Magnesium chloride	ton	5	10	0	to	6	0	0
Carbonate, light	cwt.	2	10	0	to	2	15	0
Sulphate (Epsom salts commercial)	ton	7	10	0	to	8	0	0
Sulphate (Druggists')	ton	10	0	0	to	11	0	0
Manganese Borate, commercial	ton	65	0	0	to	75	0	0
Sulphate	ton	60	0	0	to	62	0	0
Methyl acetone	ton	70	0	0	to	75	0	0
Alcohol, 1% acetone	ton	105	0	0	to	110	0	0
Nickel sulphate, single salt	ton	49	0	0	to	51	0	0
Ammonium sulphate, double salt	ton	51	0	0	to	52	0	0
Potash, Caustic	ton	32	0	0	to	33	0	0
Potassium bichromate	lb.	0	0	6	to	0	0	6½
Carbonate, 90%	ton	31	0	0	to	33	0	0
Chloride, 80%	ton	12	0	0	to	12	10	0
Chlorate	lb.	0	0	4½	to	0	0	5
Metabisulphite, 50–52%	ton	84	0	0	to	90	0	0
Nitrate, refined	ton	43	0	0	to	45	0	0
Permanganate	lb.	0	0	9	to	0	0	9½
Prussiate, red	lb.	0	4	3	to	0	4	6
Prussiate, yellow	lb	0	1	6½	to	0	1	7½
Sulphate, 90%	ton	13	0	0	to	13	10	0
Salammoniac, firsts	cwt.	3	3	0	to		—	
Seconds	cwt.	3	0	0	to		—	
Sodium acetate	ton	24	10	0	to	24	15	0
Arseniate, 45%	ton	45	0	0	to	48	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	0	4½	to	0	0	5
Bisulphite 60–62%	ton	21	0	0	to	23	0	0
Chlorate	lb.	0	0	3½	to	0	0	4
Caustic, 70%	ton	20	0	0	to	20	10	0
Caustic, 76%	ton	21	0	0	to	22	0	0
Hydrosulphite, powder, 85%	lb.	0	1	7	to	0	1	9
Hyposulphite, commercial	ton	10	10	0	to	12	0	0
Nitrite, 96–98%	ton	29	10	0	to	30	0	0
Phosphate, crystal	ton	16	0	0	to	16	10	0
Perborate	lb.	0	0	11	to	0	1	0
Prussiate	lb.	0	0	11	to	0	0	11½
Sulphide, crystals	ton	11	10	0	to	12	0	0
Sulphide, solid, 60–62%	ton	17	0	0	to	18	10	0
Sulphite, cryst.	ton	12	10	0	to	13	0	0
Strontium carbonate	ton	55	0	0	to	60	0	0
Strontium Nitrate	ton	40	0	0	to	42	0	0
Strontium Sulphate, white	ton	6	10	0	to	7	10	0
Sulphur chloride	ton	25	0	0	to	27	10	0
Sulphur, Flowers	ton	11	0	0	to	12	0	0
Roll	ton	11	0	0	to	12	0	0
Tartar emetic	lb.	0	1	3	to	0	1	4
Theobromine	lb.	0	12	6	to	0	13	0
Tin perchloride, 33%	lb.	0	1	2	to	0	1	4
Perchloride, solid	lb.	0	1	5	to	0	1	7
Protochloride (tin crystals)	lb.	0	1	5	to	0	1	6
Zinc chloride 102° Tw.	ton	21	0	0	to	22	10	0
Chloride, solid, 96–98%	ton	25	0	0	to	30	0	0
Oxide, 99%	ton	37	0	0	to	38	0	0
Dust, 90%	ton	45	0	0	to	47	10	0
Sulphate	ton	16	10	0	to	17	10	0

Pharmaceutical Chemicals

Acetyl salicylic acid	lb.	0	2	10	to	0	3	0
Acetanilid	lb.	0	1	4	to	0	1	6
Acid, Gallic, pure	lb.	0	3	0	to	0	3	3
Lactic, 1.21	lb.	0	2	9	to	0	3	0
Salicylic, B.P.	lb.	0	1	4	to	0	1	6
Tannic, leviss	lb.	0	3	4	to	0	3	6
Amidol	lb.	0	8	6	to	0	8	9
Amidopyrin	lb.	0	14	6	to	0	15	0
Ammon ichthosulphonate	lb.	0	2	0	to	0	2	3
Barbitone	lb.	0	12	6	to	0	13	6
Beta naphthol resublimed	lb.	0	1	9	to	0	2	0
Bromide of ammonia	lb.	0	0	8½	to	0	0	9
Potash	lb.	0	0	7½	to	0	0	8
Soda	lb.	0	0	8	to	0	0	8½
Caffeine, pure	lb.	0	12	0	to	0	12	3
Calcium glycerophosphate	lb.	0	5	6	to	0	6	0
Calcium lactate	lb.	0	2	0	to	0	2	3
Calomel	lb.	0	4	9	to	0	5	0
Chloral hydrate	lb.	0	4	3	to	0	4	6
Cocaine alkaloid	oz.	0	18	6	to	0	19	0
Cocain hydrochloride	oz.	0	14	6	to	0	15	0
Corrosive sublimate	lb.	0	4	6	to	0	4	9
Eucalyptus oil, B.P. (70–75% eucalyptol)	lb.	0	1	7	to	0	1	7½
B.P. (75–80% eucalyptol)	lb.	0	1	8	to	0	1	8½
Guaiacol carbonate	lb.	0	8	3	to	0	8	6
Liquid	lb.	0	9	0	to	0	9	6
Pure crystals	lb.	0	10	0	to	0	10	6
Hexamine	lb.	0	3	0	to	0	3	3
Hydroquinone	lb.	0	3	3	to	0	3	6
Lanoline anhydrous	lb.	0	0	7½	to	0	0	8
Lecithin ex ovo	lb.	0	18	6	to	1	0	0
Lithia carbonate	lb.	0	9	9	to	0	10	3
Methyl salicylate	lb.	0	2	1	to	0	2	3
Metol	b.	0	10	0	to	0	10	6
Milk sugar	cwt.	4	17	6	to	5	2	6
Paraldehyde	lb.	0	1	4	to	0	1	6
Phenacetin	lb.	0	4	10	to	0	5	0
Phenazone	lb.	0	6	9	to	0	7	0
Phenolphthalein	lb.	0	5	0	to	0	5	3
Potassium sulpho guaiacolate	lb.	0	5	0	to	0	5	3
Quinine sulphate, B.P.	oz.	0	2	3			—	
Resorcine, medicinal	lb.	0	5	6	to	0	5	9
Salicylate of soda powder	lb.	0	1	10	to	0	2	0
Crystals	lb.	0	2	0	to	0	2	3
Salol	lb.	0	2	1	to	0	2	4
Sulphonal	lb.	0	13	6	to	0	14	0
Terpene hydrate	lb.	0	1	9	to	0	2	0
Theobromine, pure	lb.	0	12	0	to	0	12	6
,, soda salicylate	lb.	0	8	6	to	0	9	0
Vanillin	lb.	1	4	0	to	1	5	0

Coal Tar Intermediates, &c.

Alphanaphthol, crude	lb.	0	2	0	to	0	2	3
Alphanaphthol, refined	lb.	0	2	6	to	0	2	9
Alphanaphthylamine	lb.	0	1	7	to	0	1	8
Aniline oil, drums extra	lb.	0	0	10	to	0	0	11
Aniline salts	lb.	0	0	10	to	0	0	11
Anthracene, 40–50%	unit	0	0	8½	to	0	0	9
Benzaldehyde (free of chlorine)	lb.	0	3	3	to	0	3	6
Benzidine, base	lb.	0	5	0	to	0	5	3
Benzidine, sulphate	lb.	0	4	3	to	0	4	6
Benzoic acid	lb.	0	2	0	to	0	2	3
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3

	Per	£	s.	d.		£	s.	d.
Betanaphthol	lb.	0	1	4	to	0	1	4½
Betanaphthylamine, technical	lb.	0	4	6	to	0	5	0
Croceine Acid, 100% basis	lb.	0	3	3	to	0	3	6
Dichlorbenzol	lb.	0	0	9	to	0	0	10
Diethylaniline	lb.	0	4	3	to	0	4	6
Dinitrobenzol	lb.	0	1	1	to	0	1	2
Dinitrochlorbenzol	lb.	0	0	11	to	0	1	0
Dinitronaphthalene	lb.	0	1	4	to	0	1	5
Dinitrotoluol	lb.	0	1	4	to	0	1	5
Dinitrophenol	lb.	0	1	7	to	0	1	9
Dimethylaniline	lb.	0	2	6	to	0	2	9
Diphenylamine	lb.	0	4	0	to	0	4	3
H-Acid	lb.	0	5	3	to	0	5	6
Metaphenylenediamine	lb.	0	4	6	to	0	4	9
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	5	9	to	0	6	0
Metatoluylenediamine	lb.	0	4	6	to	0	4	9
Monosulphonic Acid (2.7)	lb.	0	5	6	to	0	6	0
Naphthionic acid, crude	lb.	0	2	3	to	0	2	6
Naphthionate of Soda	lb.	0	2	6	to	0	2	9
Naphthylamin-di-sulphonic-acid	lb.	0	4	0	to	0	4	3
Neville Winther Acid	lb.	0	7	9	to	0	8	0
Nitrobenzol	lb.	0	0	8½	to	0	0	9
Nitronaphthalene	lb.	0	1	2	to	0	1	3
Nitrotoluol	lb.	0	1	0	to	0	1	1
Orthoamidophenol, base	lb.	0	12	0	to	0	12	6
Orthodichlorbenzol	lb.	0	1	0	to	0	1	1
Orthotoluidine	lb.	0	1	0	to	0	1	3
Orthonitrotoluol	lb.	0	0	6	to	0	0	8
Para-amidophenol, base	lb.	0	8	6	to	0	9	0
Para-amidophenol, hydrochlor	lb.	0	7	6	to	0	8	0
Paradichlorbenzol	lb.	0	0	6	to	0	0	7
Paranitraniline	lb.	0	3	0	to	0	3	3
Paranitrophenol	lb.	0	2	3	to	0	2	6
Paranitrotoluol	lb.	0	5	0	to	0	5	3
Paraphenylenediamine, distilled	lb.	0	11	6	to	0	11	9
Paratoluidine	lb.	0	5	9	to	0	6	3
Phthalic anhydride	lb.	0	2	6	to	0	2	9
Resorcin, technical	lb.	0	4	6	to	0	5	0
Sulphanilic acid, crude	lb.	0	1	11	to	0	1	0
Tolidine, base	lb.	0	7	0	to	0	7	6
Tolidine, mixture	lb.	0	2	6	to	0	2	9

Essential Oils and Synthetics

(Prices supplied by Essences and Synthetics, Ltd.)

ESSENTIAL OILS

		£	s.	d.
Aniseed Star and Redship	c.i.f. price 1/11½	0	2	2
Bergamot	14/0 to	0	14	6
Bois de Rose female		0	10	6
Camphor white	per cwt.	4	5	6
Cassia 80–85%		0	8	9
Cedarwood		0	1	6
Cinnamon Ceylon leaf	per oz.	0	0	4½
Citronella Ceylon		0	2	5
Clove oil		0	6	0
Dill		0	13	0
Geranium Bourbon		1	6	0
Gingergrass		0	9	0
Lemon		0	3	0
Lime West Indian Distilled		0	2	0
Mandarin		0	16	0
Mint dementholised Kobayashi's or Suzuki's		0	8	6
Orange Sicilian		0	9	6
Parma rosa		0	16	0
Patchouli		1	17	6
Peppermint American		0	13	6
Petitgrain Paraguay		0	7	0
Sassafras		0	5	0
Spearmint		0	14	0

SYNTHETICS

Benzyl acetate	0	2	9
Benzyl benzoate	0	2	9
Linalol	0	19	6
Linalyl acetate	1	4	6
Terpeniol	0	3	0
Coumarine	0	11	0
Heliotropine	0	5	6
Ionone 100%	1	7	0
Geraniol Java	0	6	6
Geraniol Parma rosa	1	10	0
Rhodinol extra	2	10	0
Methyl salicylate	0	2	0
Citral	0	10	0
Musk xylol	0	10	6

The Manchester Chemical Market

(FROM OUR OWN CORRESPONDENT.)

Manchester, January 4, 1923.

THE chemical market has not yet recovered from the holiday quietness, and business during the past day or two has been anything but active. The undertone, however, is healthy enough, and there should be a distinct improvement within the next few weeks. Traders in this centre, on the whole, are quite cheerful, basing their hopes apparently on the growing activity in several of the large chemical-consuming industries. The cotton trade, however, one of the largest users, is still working short time in the American section, and while this continues the home consumption of heavy chemicals is bound to be much below normal.

Heavy Chemicals

A good demand is being experienced for caustic soda from home and foreign buyers at from £19 per ton for 60-68 per cent. strength to £21 10s., for 76-77 per cent. Bleaching powder is selling well for contracts, quotations ranging from £10 10s. to £11 10s. per ton. Glauber salts keep steady at £4 10s. per ton. Soda crystals are firm, and an improving section of the market at £5 5s. to £5 10s. per ton delivered. Saltcake is still rather quiet at about £4 10s. per ton, but offers are not excessive. Sodium sulphide is unchanged from the rate last quoted here—£16 10s. for 60-65 per cent. concentrated—but the demand is inactive. Bicarbonate of soda is firm at £10 10s. per ton, in 2 cwt. bags, a fair quantity going into consumption. Ammonia alkali is easier at £7 12s. 6d. to £7 15s. per ton for 58 per cent. material. Hyposulphite of soda has not changed since last report, photographic crystals offering at £16, and commerical at £10 per ton, without, however, attracting much attention. Nitrite of soda is steady at £27 per ton, more inquiry being met with. Phosphate of soda is quiet at about £16 per ton. Chlorate of soda keeps steady at 2¾d. to 3d. per lb. Prussiate of soda is firm at 10½d. per lb., supplies still being rather restricted. Bichromate of soda is quoted at 4½d. per lb., and meets with a fairly good demand. Acetate of soda is well maintained at £23 per ton.

Caustic potash is on offer at £28 to £28 10s. per ton for 88–90 per cent. strength, with only a moderate amount of business being put through. Bichromate of potash is firm at 6d. per lb., but the demand is quiet. Yellow prussiate of potash is still rather scarce at 1s. 6d. per lb., with red offering at about 4s. Carbonate of potash has advanced since last report to £30 10s. per ton for 96–98 per cent. material, offers being short and the demand fairly steady. Chlorate of potash is quiet, but firm at 3½d. to 3¾d. per lb. Permanganate of potash is now quoted at 8d. per lb., with a slight improvement in the demand reported.

Sulphate of copper is offered at £26 10s. to £27 per ton; the home consumption is dull, though the export inquiry is said to be more active. Arsenic is in good demand and on continued scarcity £70 to £75 per ton is still quoted for white powdered, Cornish makes. Commercial Epsom salts are unchanged at about £6 per ton. Grey acetate of lime is quiet but steady at £15 10s., and brown at £8 per ton. Nitrate of lead is also rather dull at £42 per ton. White sugar of lead is quoted at £37 10s. to £38, and brown at £34, but there is no improvement in the demand. Ammonium muriate, grey, has still an easy tendency at £31 10s. to £32 per ton.

Acids and Tar Products

Tartaric acid is offering at 1s. 2d. per lb., without attracting much notice from buyers. Citric acid is quiet and unchanged at 1s. 8d. per lb. for B.P. crystals. Acetic acid values are decidedly firm at £65 for glacial and £41 per ton for 80 per cent. technical, the demand from consumers being fairly good. Oxalic acid is quoted at 7d. per lb., only a moderate amount of material being sold.

Pitch is still an interesting feature of the coal-tar products market; £5 10s. to £6 per ton, f.o.b. Manchester, is being asked, and offers of material for prompt loading are still behind the demand for shipment. Carbolic acid crystals are in good inquiry at 8½d. per lb., crude, 60 per cent. being firmly maintained at 2s. 3d. to 2s. 6d. per gallon. Benzole has a weak tendency, though the price is still round 1s. 8d. per gallon. Solvent naphtha is steady, but not too active at 1s. 9d. to 1s. 10d. per gallon for 90–160. Creosote oil is being called for for export, and the price is steady at 7¼d. per gallon.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

GLASGOW, JANUARY 3, 1923.

THERE has been little business transacted during the past week and there is nothing of importance to record.

Industrial Chemicals

ACETONE.—Continues in short supply for early delivery.

ACID ACETIC.—Glacial 98/100%, £55 to £58 per ton, ex wharf. Lower strengths inclined to be higher; 80% technical about £42 to £44 per ton; 80% pure about £43 to £46 per ton.

ACID BORACIC.—Crystal or granulated, £55 per ton; powdered, £57 per ton, carriage paid U.K. stations.

ACID CITRIC.—In little demand, 1s. 7d. per lb., ex store.

ACID FORMIC, 95%.—Moderate inquiry, £54 per ton.

ACID HYDROCHLORIC.—Price remains unchanged at 6s. 6d. per carboy, ex works.

ACID NITRIC, 84°.—Quoted £27 per ton, ex station.

ACID OXALIC.—Price about 7d. to 7¼d. per lb.

ACID SULPHURIC.—144°, £4 per ton; 168°, £7 5s. per ton, ex works, in full loads. De-arsenicated quality, £1 per ton more.

ACID TARTARIC.—Quoted 1s. 2d. per lb., ex store.

ALUM CHROME.—Price about £25 to £26 per ton, f.o.b. U.K., early shipment.

ALUM LUMP POTASH.—In little demand, £12 10s. to £13 per ton, ex store.

AMMONIA ANHYDROUS.—Moderate inquiry, 1s. 6d. per lb., ex station.

AMMONIA CARBONATE.—Lump 4d. per lb.; ground 4¼d. per lb., delivered.

AMMONIA MURIATE.—Grey galvanisers, £31 to £32 per ton; fine white crystals offered at £26 per ton, c.i.f. U.K.

ARSENIC, WHITE POWDERED.—Very hard to obtain for spot delivery. Quoted £63 to £65 per ton, January delivery.

BARIUM CHLORIDE, 98/100%.—Offered at £18 to £19 per ton. In little demand.

BARYTES.—Finest white English, £5 5s. per ton, ex works. Continental offered at about the same prices, ex store various ports.

BLEACHING POWDER.—Price £11 10s. per ton, ex station, spot delivery.

BORAX.—Crystal or granulated, £28 per ton; powdered, £29 per ton, carriage paid U.K. stations.

CALCIUM CHLORIDE.—Price £5 15s. per ton, ex quay or station. Offered from Continent at about £4 per ton, c.i.f. U.K.

COPPER SULPHATE.—Quoted £26 per ton, f.o.b. U.K.

COPPERAS, GREEN.—Price about £3 15s. to £3 17s. 6d. per ton, ex works.

FORMALDEHYDE, 40%.—Inclined to be scarce. Now quoted £88 to £89 per ton, ex wharf.

GLAUBER SALTS.—Quoted £4 per ton, ex store.

LEAD.—Red lead, £38 15s. per ton; white lead, £50 15s. per ton. Carriage paid U.K. stations in 5 ton lots.

LEAD ACETATE.—Fine white crystals offered at £37 per ton, c.i.f. U.K. ports.

LEAD NITRATE.—Price about £42 per ton, ex wharf.

MAGNESITE, GROUND CALCINED.—£7 to £10 per ton, ex store.

MAGNESIUM CHLORIDE.—Offered for prompt shipment from Continent at £2 17s. 6d., c.i.f. U.K. Spot lots at about £4 per ton, ex store.

MAGNESIUM SULPHATE (EPSOM SALTS).—Price now £7 per ton, for commercial quality; £8 15s. B.P. quality, in bags, ton lots.

NAPHTHALENE.—Sublimed flakes offered at £12 per ton, ex works.

POTASSIUM BICHROMATE.—English make 6d. per lb. delivered.

POTASSIUM CARBONATE, 88/92%.—In little request, £27 per ton, ex store, spot.

POTASSIUM CAUSTIC, 88/92%.—Spot material at about £29 10s. per ton, ex store.

POTASSIUM CHLORATE.—Crystals or powder, 3½d. per lb., ex store

POTASSIUM MURIATE, 90/95%.—Offered at £10 per ton, f.o.r. works, basis 80%.

POTASSIUM NITRATE (SALTPETRE).—Offered at £25 per ton, c.i.f. U.K.

POTASSIUM PERMANGANATE.—B.P. crystals quoted 7½d. per lb., ex store.

POTASSIUM PRUSSIATE (YELLOW).—Unchanged at 1s. 6d. to 1s. 6½d. per lb.

POTASSIUM SULPHATE, 90/92%.—Quoted £15 per ton, f.o.b. U.K., basis 90%.

SODIUM BICARBONATE.—Refined recrystallised £10 10s. per ton, ex quay or station; m.w. quality, 30s. per ton less.

SODIUM BICHROMATE.—English make, 4½d. per lb., delivered U.K.

SODIUM CARBONATE.—Soda crystals, £5 5s. to £5 10s. per ton, ex quay or station; alkali, 58%, £8 17s. 6d. per ton, ex station, spot delivery.

SODIUM CAUSTIC.—76/77%, £21 10s.; 70/72%, £19; 60/62%, broken, £21 5s.; 96/98%, powdered, £24 17s. 6d. per ton, ex station, 4 ton lots.

SODIUM CHLORATE.—Quoted 3¼d. per lb., ex store.

SODIUM HYPOSULPHITE.—Commercial, £10 10s. per ton, ex station; pea crystals about £16 10s. per ton.

SODIUM NITRATE.—96/98%, refined quality, £12 10s., f.o.r.

SODIUM PRUSSIATE (YELLOW).—Price about 10¾d. per lb., ex store.

SODIUM SULPHATE (SALTCAKE 95%).—Good export inquiry. Price for home consumption, £4 per ton, delivered station.

SODIUM SULPHIDE, 60/62%.—Offered from Continent at £14 5s. per ton, c.i.f., U.K.; 30/32% crystals about £8 10s. per ton, c.i.f. U.K.

SULPHUR.—Government surplus stocks of Sicilian thirds available at £3 10s. to £3 15s. per ton, ex depot; flowers, £11 per ton; roll, £10 per ton; rock, £9 per ton; ground, £9 per ton. Prices nominal. Slight inquiry for roll.

TIN CRYSTALS.—Unchanged at 1s. 2d. per lb.

ZINC SULPHATE.—Price about £13 per ton, ex wharf.

NOTE.—The above prices are for bulk business, and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

ALPHA NAPHTHYLAMINE.—1s. 6½d. per lb. delivered, packages free.

ANILINE SALT.—Home inquiry. Quoted at 11½d. per lb. in ½ and one ton lots, carriage paid, packages free.

BENZIDINE BASE.—6s. 6d. per lb., 100% basis, delivered, packages free, in ton lots.

BETA NAPHTHOL.—Price quoted 1s. 2d. per lb., casks included, ton lots.

CLEVES ACID.—Small inquiry. Price 4s. 2d. per lb., 100% basis, delivered, packages free.

METAPHENYLENEDIAMINE.—Export inquiry. Price quoted 5s. 2d. per lb., packages inclusive.

PARADICHLORBENZOL.—Offeredf or export at £50 per ton, f.o.b., packages inclusive.

PARANITRANILINE.—Offered at 3s. per lb. delivered, packages free.

SULPHANILIC ACID.—Offered at 1s. 6d. per lb., 100% basis, ton lots, packages free.

Application of Chemistry to Egyptology

IN connection with the recent discovery of antiquities in the tomb of King Tutankhamen at Luxor, Mr. A. Lucas, Director of the Chemical Department of the Egyptian Government informed a correspondent of the *Morning Post* that it would be necessary for the objects to be chemically treated before they could be removed. As the result of experiments Mr. Lucas finds that the best preservative materials are a solution of celluloid in amyl acetate, a solution of collodion in ethyl-alcohol, a solution of paraffin wax in benzene, hot melted paraffin wax, a solution of canada balsam in xylol or benzol, and casein adhesive. Each of these materials has particular properties, and is used for a special purpose.

Company News

AFRICAN SALTPETRE CO.—The debit balance of £20,175 brought down has been reduced to £19,718.

EGYPTIAN SALT AND SODA CO.—A dividend of 17½ per cent., less tax, for the year, is payable on January 8.

DISTILLERS' CO.—It is announced that the consideration of interim dividend will not take place until January 12.

GOODLASS, WALL AND CO.—Warrants have been posted for the six months' interest to December 31 on the 7½ per cent. cumulative preference shares.

PINCHIN, JOHNSON AND CO.—Warrants have been posted in respect of the 6½ per cent. dividend on the preference shares for the half-year ended December 31 last.

ALLEN-LIVERSIDGE, LTD.—A final dividend at the rate of 9 per cent. per annum, less tax, has been announced for the six months to October 31 last, making 8 per cent. for the year.

ANGLO-PERSIAN OIL CO., LTD.—The special resolutions, passed at the annual meeting on December 11 last, were confirmed at an extraordinary general meeting held on December 28.

RECKITT AND SONS, LTD.—An interim dividend of 8d. per share, less tax, on the ordinary shares for the past quarter is payable forthwith. The payment for the corresponding period of last year was 6d. per share.

NEW TRANSVAAL CHEMICAL CO.—Final dividends have been declared for the year to June 30 last of 3 per cent., less tax, on the cumulative first preference shares and of 4 per cent., less tax, on the cumulative "A" preference shares.

ANGLO-PERSIAN OIL CO., LTD.—Underwriting arrangements were made on Tuesday for an issue of 850,000 £1 ordinary shares. These shares will be offered for public subscription on January 10 at £3 15s. per share, which compares with a price of £3 5s. at which the first public issue of £600,000 shares were made.

AMALGAMATED ZINC (DE BAVAY'S), LTD.—The secretary reports the completion of negotiations with the Broken Hill South, Ltd., as the result of which the company has bought the tailings which will be produced by Broken Hill South, Ltd., between December 31, 1922, and the date of completion of the flotation plant now under construction by that company.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

LOCALITY OF FIRM OR AGENT.	MATERIAL.	REF. NO.
Canada ..	Drugs, soaps, etc.	—
Spain ..	Sulphate of ammonia and nitrate of soda.	17
Switzerland ..	Heavy chemicals	21
Canada ..	Sodium sulphate	10174/ E.D./C.C.
Argentina ..	Druggists' sundries, etc. ..	6920/ F.L./C.C.

Tariff Changes

ROUMANIA.—Poppy seed may now be exported subject to a duty of 40,000 lei per wagon.

RUSSIA.—New regulations regarding procedure in export and import operations were published in the Board of Trade Journal of December 28 (p. 742).

DENMARK.—The text of a tariff revision Bill which was re-introduced into the Danish Parliament on December 1 last, may be seen at the Tariff Section of the Department of Overs Trade, 35, Old Queen Street, London.

Low Temperature Carbonisation

Continuous Operation of the Barnsley Plant

AT the annual general meeting of Low Temperature Carbonisation, Ltd., held in London on December 29, the chairman (Sir Harry Brittain, M.P.) said that the plant at Barnsley had been running continuously night and day for the last nineteen months. Certain important developments, however, proved to their engineers that they could see a way of reducing the capital cost of construction by some 40 per cent. and the labour costs by nearly 50 per cent. on each ton of coal carbonised. In addition, not only was this improved retort self-filling and self-discharging, but it was continuous in its operation.

Consequent on these improvements, it was only within the last few weeks that the construction company had been able to furnish the latest plans and specifications to some of the leading gas companies and colliery undertakings embodying the latest cost and balance-sheet figures. It was agreed by the engineers and other experts that this improved plant was very far ahead of any carbonisation proposition known to be in operation (either high or low temperature) in any part of the world. On account of the comparatively small capital outlay and the high yields of gas and smokeless fuel, their engineers had little doubt of its general adoption in gasworks.

Continuing, the chairman said they had recently been approached by financial groups who were discussing with the company an important proposal to finance the erection of carbonising plants at gasworks, electric undertakings, collieries, and other large fuel-consuming concerns throughout the country, on the remunerative lines pursued before the war with high temperature coke ovens.

In conclusion, the chairman said they were engaged in the evolution of an economic industrial reform, no less vital than was the discovery of steam power over a century ago. The results of low temperature carbonisation alone could give independence in our liquid fuel supply in time of war.

Government Training Grant Scheme

IN connection with the Government Training Grant Scheme the Editor of THE CHEMICAL AGE has received the following letter of thanks from Viscount Burnham:—

The Daily Telegraph,
Fleet Street, E.C.4.
December 29, 1922.

DEAR SIR,—As the Government Training Grant Scheme administered by the Appointments Department is drawing to a close it will not be necessary for the Panels to meet after the 30th inst. As Chairman of the London District Selective Committee I wish to thank you for your loyal and untiring co-operation in helping to make the Scheme so successful by interviewing the large number of applicants and making recommendations to the Grants Committee on behalf of deserving eligible candidates. The task has been a strenuous one and called for sacrifices of your valuable time, but it is gratifying to know that the public money has been well spent, and that, except in a few exceptional cases, the trainees have done well in their examinations and have been absorbed into their various professions. The object for which the Scheme was instituted has been fulfilled. I therefore beg to offer you my sincere thanks for your loyal co-operation in making the London District Selective Committee such a success. Should the necessity arise I feel sure that you will not mind being called upon to investigate any exceptional cases.—Yours very truly, BURNHAM.

F. E. Hamer, Esq.,
Messrs. Benn Brothers, Ltd., 8, Bouverie Street, E.C.4.

Finsbury Old Students Association

A SMOKING concert in connection with the above Association will be held at the Engineers' Club, London, on Friday, January 19, when the chair will be taken by the new President, Mr. W. M. Mordey, at 8 p.m. Tickets, 2s. 6d. each, may be obtained from members of council or from the hon. secretary, Mr. H. P. Guy, 74, Silver Street, Edmonton N.18. The concert will be preceded by an informal dinner at 6.45 p.m.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

HUGHES, Mr. J. H., Red House, Llandilo, chemist. (C.C., 6/1/23.) £18 5s. 5d. November 8.

MACKAY, H. A., 111, Warwick Road, Kensington, analytical chemist. (C.C., 6/1/23.) £17 17s. 4d. November 8.

PENNINGTON, Miss, 563, West Derby Road, Tue Brook, chemist. (C.C., 6/1/23.) £16 3s. 4d. November 4.

STEWART, Mr., 524, Barking Road, Plaistow, chemist. (C.C., 6/1/23.) £14 6s. 6d. November 3.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act, of 1908, provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

LONDON SMELTING CO., LTD., London, E.C.—(M., 6/1/23.) Registered December 19. £10,000 debentures; general charge. *Nil. November 24, 1921.

PHILLIPS AND SON (CHEMISTS AND OPTICIANS), LTD. Wigan. (M., 6/1/23.) Registered December 20. £3,000 mortgage to H. Coverdale, Wigan, and another; charged on 23 and 25, Standishgate, Wigan, and other buildings. *Nil. November 8, 1922.

SMITH (JOHN) AND SON (HALTWHISTLE), LTD., paint manufacturers. (M., 6/1/23.) Registered December 19. £20,000 debentures; general charge. *Nil. April 5, 1922.

SYNTHETIC PRODUCTS CO., LTD., London, E.C. (M., 6/1/23.) Registered December 18. £500 charge, to Research Syndicate Ltd.; charged on premises at King's Lynn, also general charge. *£16,155 9s. 8d. December 31, 1921.

Satisfactions

BROWN (HAROLD E.), LTD., Hull, chemists. (M.S., 6/1/23.) Satisfaction registered December 21, £200, registered June 20, 1911.

METALLURGICAL CO., LTD., London, S.W. (M.S., 6/1/23.) Satisfactions registered December 18, £8,000, registered July 9, 1913; £12,000, registered August 10, 1915; and £5,000, registered March 16, 1916.

London Gazette

Company Winding-Up Voluntarily

CUMBERLAND COAL POWER AND CHEMICALS, LTD. (C.W.U.V., 6/1/23.) A. Clarke Vincent, F.S.A.A., 13, Queen Street, Cheapside, London, E.C.4, Incorporated Accountant, appointed liquidator.

Order Made on Application for Discharge

JOHNSON, Joseph Melbourne, formerly High Street, Upton-on-Severn, Worcestershire, chemist, but now of Carless Avenue, Harborne, Birmingham, chemist's assistant. (O.M.A.D., 30/12/22.) Order, November 22, 1922. Discharge granted subject to debtor consenting to Judgment for £50, payable forthwith. (NOTE.—£50 paid to Official Receiver in lieu of entering judgment.)

New Companies Registered

ARMOUR LANGLEY, LTD.—Fish Dock Road, Grimsby. Manufacturers of fertilisers, oil, glue, soap and tallow. Nominal capital, £1,000 in £1 shares.

AUKLAND'S PHARMACY, LTD., 96, Camden Road, N.W.1. Manufacturing, wholesale, retail, consulting and analytical chemists and druggists. Nominal capital, £100 in £1 shares.

BAISS BROTHERS AND CO., LTD. Manufacturing chemists, agents for and dealers in drugs and chemicals, etc. Nominal capital, £20,000 in £1 shares. A subscriber: J. Tofts, 1, Mostyn Road, Brixton, S.W.9.

BETA, LTD., 3, Grimshaw Street, Burnley. Chemists, druggists, analysts, drysalters, manufacturers of chemicals and manures. Nominal capital, £1,000 in £1 shares.

BRITISH GALVANIZING CO., LTD. Manufacturers of and dealers in any chemical solution or preparation used in connection with any process of galvanisation; manufacturing chemists, etc. Nominal capital, £5,000 in £1 shares. A director: F. I. Haywood, 92, Billiter Buildings, London, E.C.3.

CAFFERATA AND CO., LTD., Beacon Hill, Newark-on-Trent, Notts. Plaster, cement and brick manufacturers. Nominal capital, £150,000 in £1 shares (90,000 cumulative preference and 60,000 ordinary).

LEITH PAINT CO., LTD., 13, Assembly Street, Leith. Wholesale paint and varnish merchants. Nominal capital, £7,000 in 3,500 ordinary and 3,500 6 per cent. cumulative preference shares of £1 each.

LITHOS CHEMICAL PRODUCTS, LTD., 12, Abchurch Lane, London, E.C. Chemists, druggists, drysalters, oil and colourmen, etc. Nominal capital, £1,500 in £1 shares (1,000 ordinary and 500 7½ per cent. cumulative preference).

MALARIAL SPECIFIC CO., LTD., 9, Billiter Square, London, E.C. Chemical manufacturers, drysalters; manufacturers of and dealers in medicines, medicinal preparations and drugs. Nominal capital, £15,000 in 10,000 preference shares of £1 each and 100,000 ordinary shares of 1s. each.

JOSHUA MARGERISON AND CO., LTD. Manufacturing and general chemists and druggists; soap manufacturers; manufacturers, refiners and preparers of and dealers in oils, glycerine, etc. Nominal capital, £100,000 in £1 shares. A subscriber: G. Margerison, Hill Crest, Kidderminster.

Recent Wills

Mr. R. N. Wilson, of Egglescliffe, Durham, Chairman of the Egglescliffe Chemical Co., Ltd..... £64,760

Mr. Horace Fabian Cheshire, F.I.C., of Hastings, for forty-one years Public Analyst for Hastings £1,438

Mr. Archibald Balfour, of Pont Street, Chelsea, London, Chairman of the Rosario Nitrate Co., Ltd..... £57,444

Mr. William Bowker, of Birkdale, Lancs, Chairman of R. R. Minton and Co., Ltd., oil manufacturers, Liverpool..... £10,752

Mr. Frederick Ashton Winckley, of Sutton-on-Hull, chairman of J. Winckley and Co., Ltd., oil and seed merchants..... £37,361

Mr. Arthur Major Hugill, of Hanover Street, Liverpool, late a director of R. Sumner and Co., Ltd., wholesale druggists..... £48,995

Mr. William Crooks, of Linden House, Shenfield Common, Brentwood, Essex, formerly in the employ of Nobel's Explosive Co., Ltd..... £41,489

Mr. Victor Herbert Gatty, of Whiteholme, Hoghton, Lancs, managing director of F. A. Gatty and Co., Ltd., the inventor of fast khaki dye £89,566

Mr. John Wylde, of Mayfield, Chislehurst, Kent, senior partner of Thomas Keating, manufacturing chemists, and of John Wylde, drug grinders..... £49,480

Mr. George Speight, of Belmont, Park View Road, Bradford, governing director of Stephenson Brothers, Ltd., soap manufacturers, drysalters and oil merchants..... £81,979